

# History of Sports

VOLUME 1

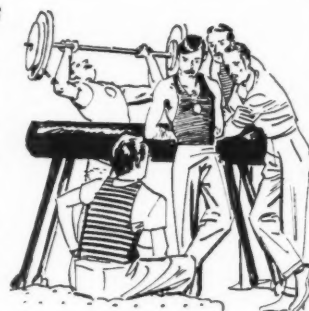
NUMBER 3

## BASKETBALL

### *Invented for 18 Students*

In the winter of 1891 a class of 18 young men at a training school in Springfield, Mass., were sitting around a gym wondering if there wasn't some more interesting way of getting their regular daily exercise than the usual dull routine. They wanted an indoor winter game that could take the place filled by football in the autumn and baseball in the spring and summer.

The school supervisor turned the problem over to young James Naismith, the class instructor. He told Naismith to invent a game that could be played indoors, without violent bodily contact and at the same time provide enough action and interest to exercise and hold the attention of these young students.



### *Indoor Football*



Naismith first thought that he might be able to adapt Rugby Football to some kind of indoor game. This idea failed, however, because football without body contact didn't work and body contact was dangerous indoors. Then Naismith

had the inspiration that was to make him the founder of the only major sport invented in America—the only major sport that does not trace its beginning to older, simpler forms, but is the product of one man's imagination. He invented basketball! And his class proved that the new game not only was practical but that it was fun!

ball was designed for teams of nine—3 forwards, 3 centers and 3 guards. The only equipment was a regulation soccer ball and two peach baskets nailed to the wall and rules were almost non-existent. Basketball grew quickly, though, and as the game presented new problems, rules were developed to meet them. The number of players on a team was changed to allow 9, 7 or 5 and then finally set at 5. Scoring was worked out and a rules committee set up to govern the rapidly growing game.

Under the direction of this committee, changes have been made from time to time to improve the game. Their most recent important change is the almost complete elimination of the center tap in an effort to speed up play. Since its invention the popularity of basketball for players and spectators has grown with tremendous speed and today it is played and watched all over the world.



### *Soccer Ball and Peach Baskets*

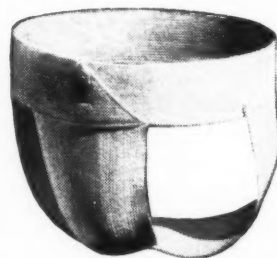
Because there were 18 students in James Naismith's class, the original game of basketball.

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### *Like basketball, athletic equipment has come a long way*

IT IS a far cry from the original crude 9-man basketball of the 1890's with its soccer ball and peach baskets to the streamlined, skilful game of today. As in every game, improved equipment has played an important part in this development. And no matter what the sport, there is no more important single piece of equipment that safeguards the health, skill and pleasure of the players than a good athletic supporter. That's why so many coaches and trainers refuse to take chances with just any supporter—insist on one they can count on for snug, lasting support, long wear and economy. That's why so many athletes wear Bike!

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# SCHOLASTIC COACH

Reg. U. S. Pat. Off.

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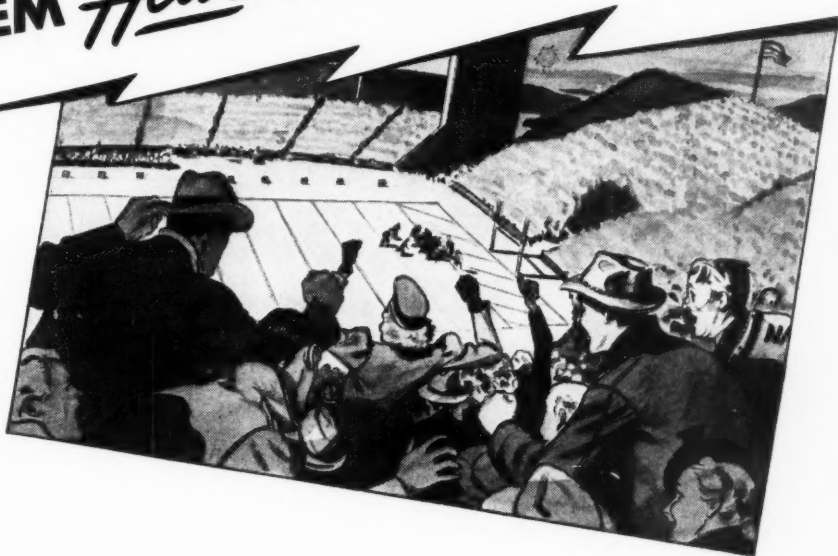




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A  
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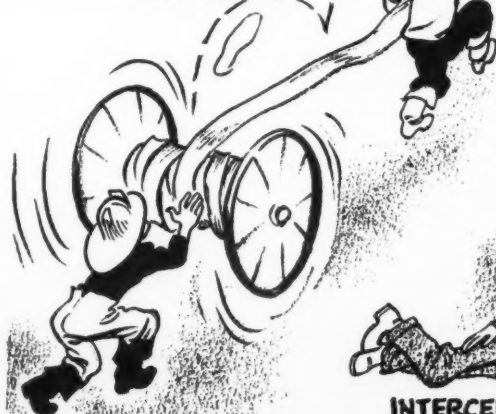
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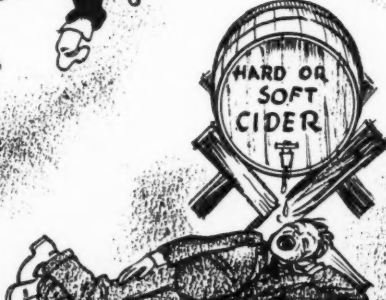


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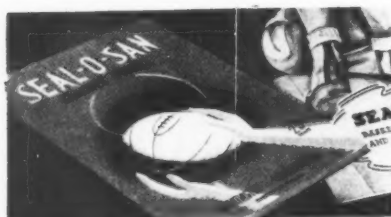




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# SEAL-O-SAN

SEAL AND FINISH FOR GYMNASIUM FLOORS



These pictures show Bradley Tech in the process of whitening down a 12-point Long Island University lead in the

semi-finals of the intercollegiate invitation tourney at Madison Square Garden two years ago. L.I.U. won the game, 36-32.

## BRADLEY TECH'S THREE-WAY ATTACK

By A. J. Robertson

The Bradley Tech five year in and year out tackles one of the toughest, most representative schedules in the country, and invariably comes through with flying colors. Twice, in 1938 and 1939, the Indians earned invitations to the national collegiate tournament in Madison Square Garden (N.Y.). Both times it took the generally recognized national champions (Temple in 1938 and Long Island University in 1939) to beat them. During these seasons Tech won 37 of 40 regularly scheduled games, outscoring many of the most formidable powers from coast to coast. To A. J. Robertson, basketball coach and director of athletics, goes the credit for producing these smooth, smart, superbly-rounded quintets.

AS LONG as basketball remains the whirling, shifting, unpredictable thing it is, Bradley Tech will continue to use all styles of offense. From experience we know that winning basketball is predicated on versatility. A team that is equipped with one, and only one, mode of attack cannot prosper in this era of heterogeneous defenses and offenses.

To play winning basketball consistently, you've got to be prepared for everything. Your boys must know how to adapt their game to zone defenses, man-to-man defenses, retreated defenses, etc.

At Bradley our choice of attack varies from game to game according to the particular system of offense and defense met. In general, however, we lay siege to the basket in one of three ways. Our main "batteries" include:

1. A fast breaking attack designed to beat the opponents down the floor and create a numerical advantage in the region of the Bradley basket.

2. A deliberate plan of working

the ball through a set defense, with either one post and four men circulating or with two posts and three men circulating. The usual inside and outside screens are used, with the post men also screening for set shots and feeding the ball to cutters.

3. A ball possession game to draw out the defense. By use of sudden cuts and screens, the outside men break by their guards and drive to-

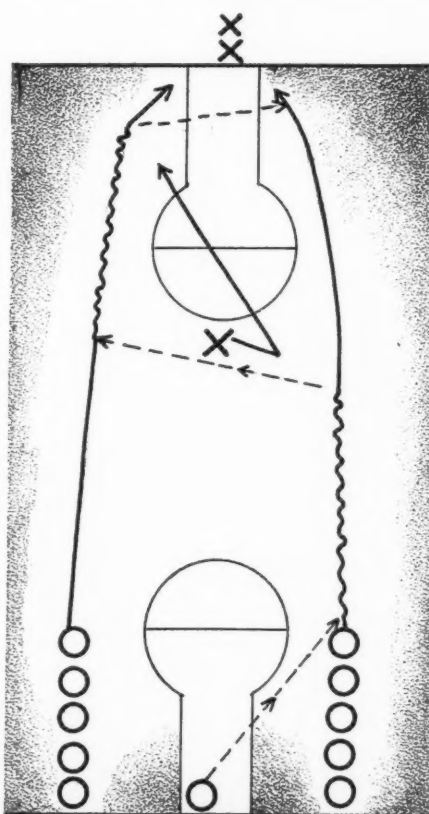
ward the basket, creating two-on-one and three-on-two situations.

The Tech squad is constantly being drilled on the technique of scoring from these situations. Two-on-one drills (Diag. 1) are organized with these things in mind: (a) The ball must always be thrown to the player farthest down the floor. (b) The ball is advanced with a fast dribble until the player is challenged by a guard. It is then passed off to the other offensive man, who drives for the basket. If he is challenged he also passes off.

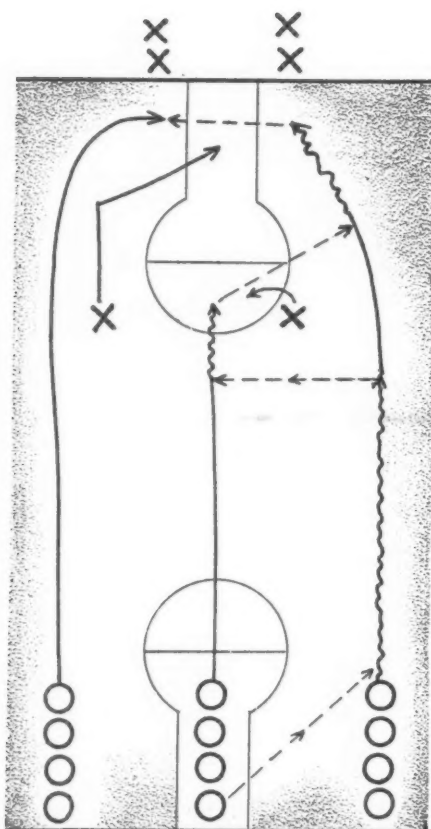
The three-on-two drills (Diag. 2) adhere to the same principles with one notable exception. Before opposition is encountered, the ball must be passed to the man in the middle. These two-on-one and three-on-two techniques are of great value in developing offensive ability in either the fast break, the deliberate offense or the possession types of games.

The opportunity to fast break may arise from an intercepted pass, a defensive rebound or from an out-of-bounds play in the defensive half of the floor. The outlet pass should be thrown down the sidelines and preferably not up the middle or across the court. Dribbling in the defensive half of the court ruins a fast break attack.

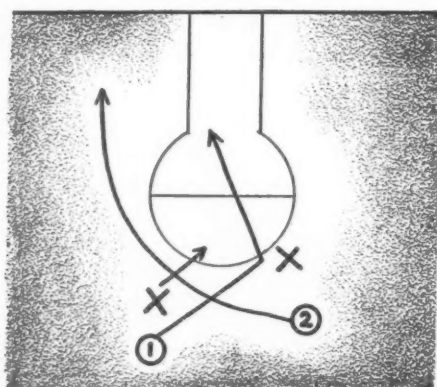
Against a man-to-man defense which is set up and waiting, we use a combination of opportune cutting and inside and outside pick-offs and screens. Diags. 3, 4 and 5 show the fundamental ingredients of these maneuvers.



Diag. 1

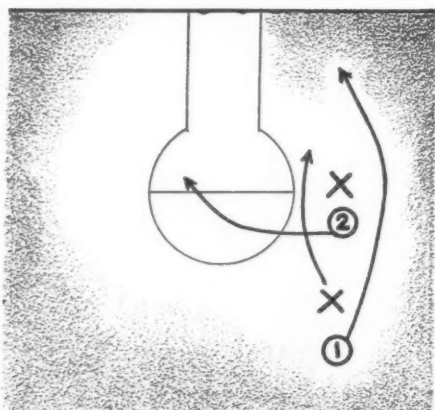


Diag. 2



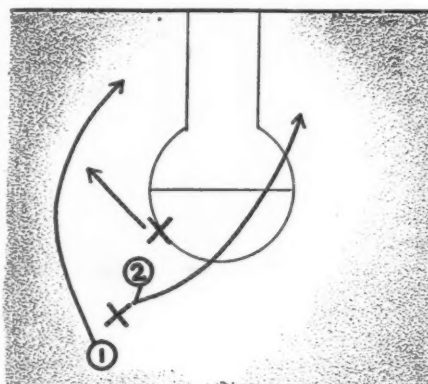
Diag. 3

In **Diag. 3** (inside screen) 1 screens for 2. If no shift is made 2 breaks free. If X1 shifts to 2, 2 may get position on X2 by cutting quickly to the basket.



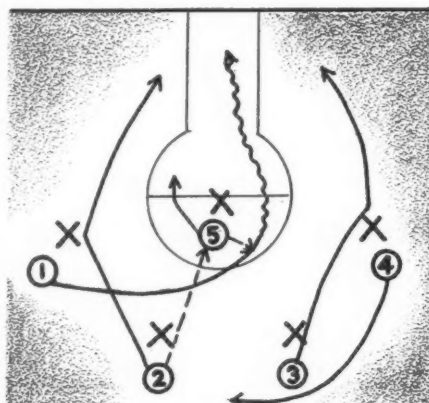
Diag. 4

In **Diag. 4** (outside screen) 1 cuts by 2, forcing 1 to take a short cut in covering him. If 2 breaks to the inside he may run X2 into the short-cutter, X1.



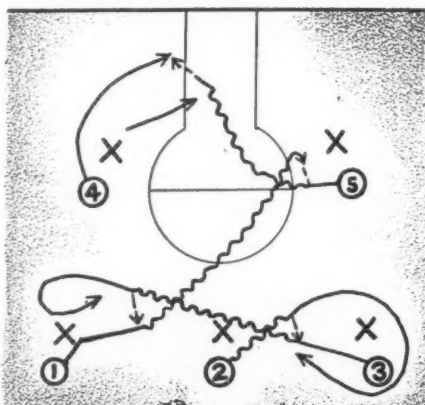
Diag. 5

The pick-off screen is exemplified in **Diag. 5**. No. 2 screens X1, and 1 cuts to the outside. If X2 doesn't shift, 1 is free. No. 2, after screening X1, breaks to the inside obtaining position on X1.



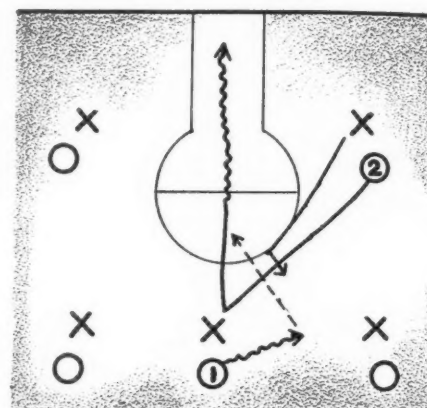
Diag. 6

With these screens and picks as a basis, plays may be designed for the team attack. **Diag. 6** illustrates a typical play from a single pivot. No. 2 passes to pivotman 5 and then screens for 1, who cuts around the post. Meanwhile 3 fakes a screen for 4 and cuts for the basket. The latter comes back to protect.



Diag. 7

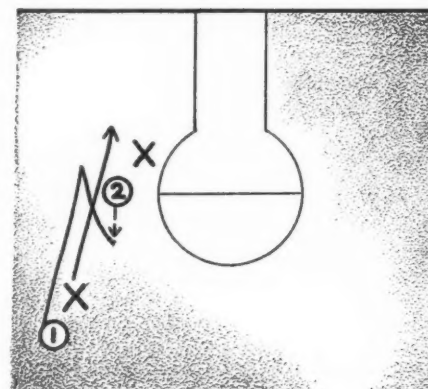
A play from a double pivot set-up is shown in **Diag. 7**. No. 2 dribbles to the right, passes to 3 and holds still while 3 dribbles to the left and passes to 1. If 1 gets the jump on his man, he dribbles diagonally across and screens for 5, who cuts around him and dribbles for the basket. If X4 switches to 5, the dribbler passes to 4 who maneuvers into position for the pass.



Diag. 8

**Diag. 8** gives an effective variation of the pick-off screen. Here 2 sets up the screen for 1. If the defense doesn't shift 1 dribbles into the clear for the basket. If X2 shifts to 1 then the latter dribbles to the side (as shown) and passes to 2 who has a lead on X1.

Against extremely retreated defenses, we do not try to carry the ball all the way in. Set shots are a more effective means of scoring against this type of defense. Good pot shots may be obtained by a circulation of inside screens, which forces the defenders to retreat still farther back to evade them, and by the use of a post man as illustrated in **Diag. 9**.



Diag. 9

No. 1 passes to postman 2 and fakes a cut to the outside, forcing his guard to retreat quickly to head him off. The cutter suddenly puts on the breaks and comes back for a pass from the post. Protected by

(Concluded on page 38)



# FLOODLIGHTING A HIGH SCHOOL STADIUM

By Harry Hays

Since Fawcett Stadium (Canton, Ohio) was equipped with lights, night attendance has averaged between 22,000 and 25,000 spectators for each of the important school games. The stadium has a seating capacity of 30,000.

**E**NGINEERS who designed and installed the lighting system at Fawcett Stadium, home field of Canton, Ohio, High School, claim it is one of the finest high school plants in the country, both from the standpoint of visibility and application. The illumination level on the field of play measures 40 foot-candles, and is obtained with an electrical consumption of only 270 kilowatts; or, translated into a figure for an average two-and-one-half hour football game, approximately 675 kilowatt hours.

Because it employs 96 floodlights, Fawcett Stadium's lighting system earns an "A" rating for high school fields. This, simply explained, means that it meets the qualifications of the highest lighting bracket for high school football fields. There are three such ratings: "A," "B," and "C," and they are based upon the minimum number of floodlights used to illuminate the playing area. A minimum of 40 lights must be employed for a Class C rating; 64 for Class B; and 84 for Class A.

Football fields have become pretty standard by now, so it is not surprising that systems for their lighting have also become fairly standardized, even though such systems are still comparatively young—so far as use is concerned. Light-



Photos courtesy Westinghouse

**FAWCETT STADIUM** as it looks under the lights. Boasting eight poles and ninety-six 1500-watt floodlights, it qualifies as a Class A high school football field.

ing for nighttime sports has now reached the point where the observance of a few simple rules and the selection of good equipment almost positively assures a good installation.

The most important single requisite of a good installation is proper location of the lighting fixtures. Interlocked with this is the type of fixture selected, whether it throws a wide beam or a narrow beam of light. These factors determine the evenness of the light distribution on the playing field.

Lighting engineers agree that the best lighting may be easiest obtained by mounting the lights a considerable distance back from the edge of the field, and fairly high. Under such ideal conditions three poles or supports are generally used on each side of the field, each carrying its share of the total number of fixtures.

On many fields this type of installation is impractical, if not impossible, due to the mechanical layout. For example, the stands may not be suited for supporting towers, or space limitations may prevail. This does not preclude, by any means, that such a field cannot be properly lighted.

This is adequately shown by an examination of the location aspects of the Canton High School stadium. Here the logical location of the floodlight towers was on a line about 30 feet back from the edge of the playing field. To obtain the proper light distribution on the

field, four towers were used on each side, spaced 100 feet apart, and carrying the floodlights 60 feet above the ground. Because the lights were only 30 feet from the edge of the area to be illuminated, a number of wide angle floodlights were employed to light the field's edges evenly.

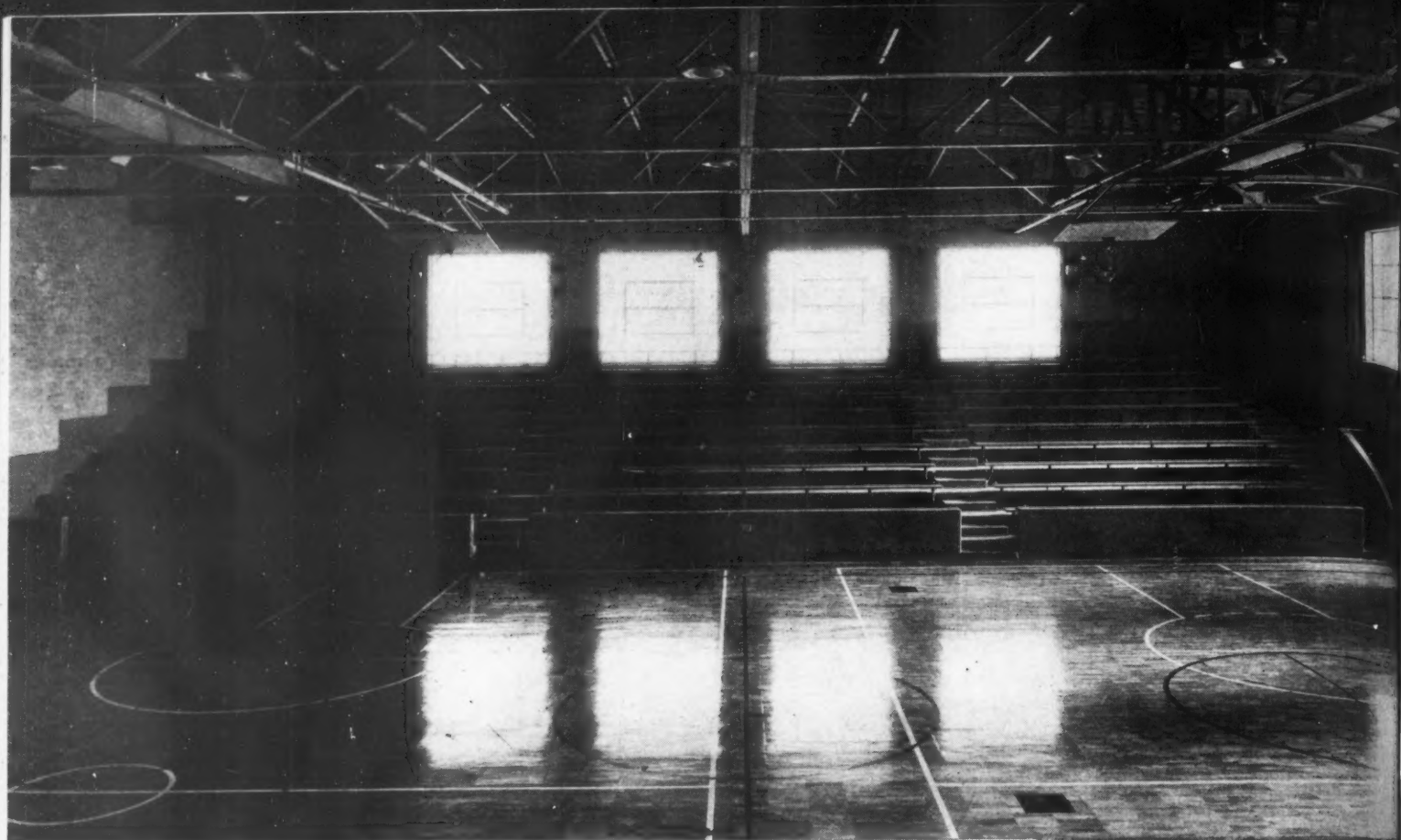
The distribution system for a football field may be either overhead or underground wiring. The overhead system, in some instances, may be slightly more economical, but it has the disadvantage of not presenting as good an appearance as an underground system. Then, too, there is always the chance, although admittedly very slight, that the football might strike and damage the overhead wires.

The distribution system at Fawcett Stadium is carried underground through conduits running alongside of and across the field from the main transformer vault located in the northeast stands. A small circuit breaker switches the primary of the transformers on and off and protects the distribution system.

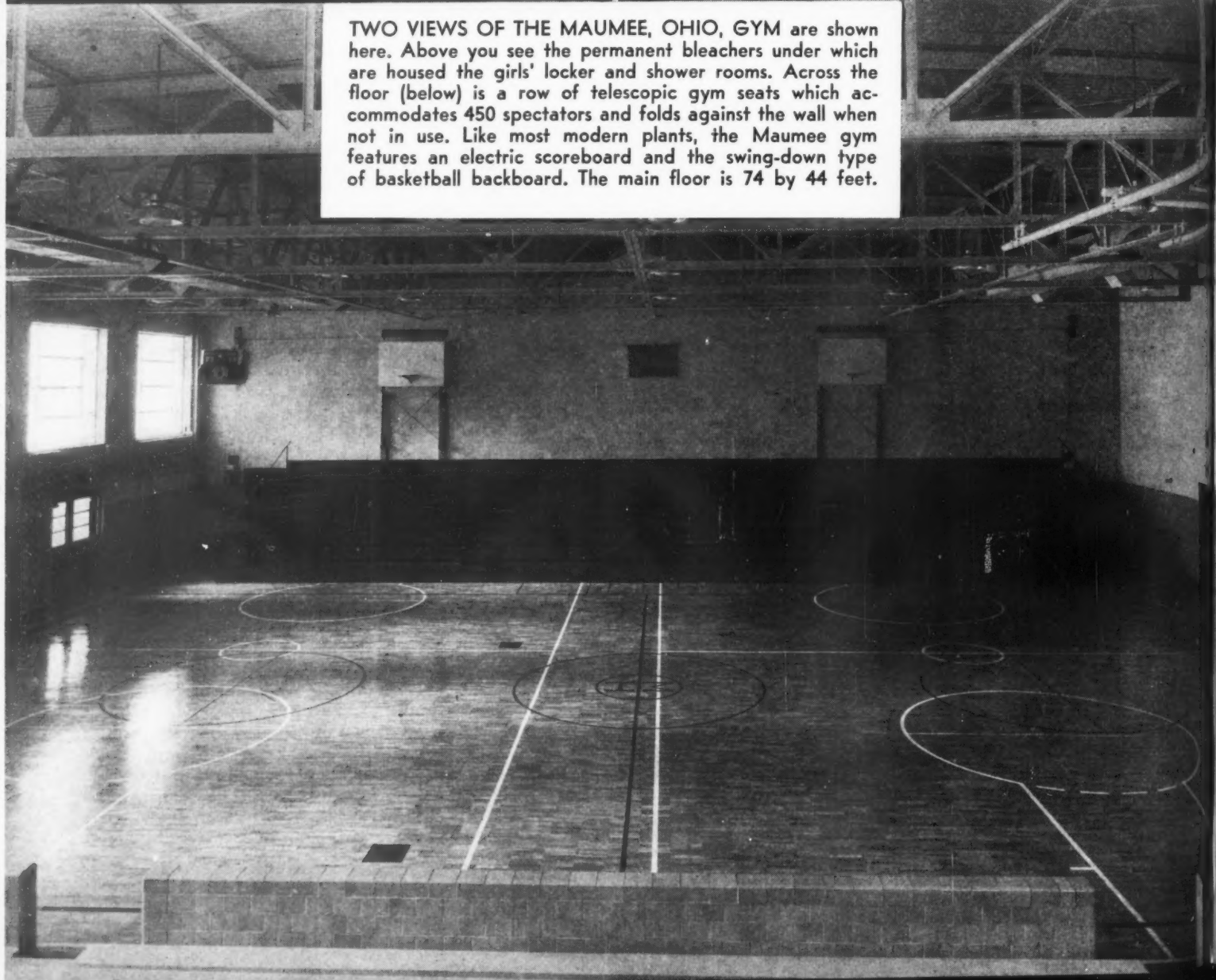
The floodlights used are closed type units built of lightweight "al-clad" spun aluminum. This type of construction keeps the interior of the unit (reflector and lamp) free from dust which, if allowed to collect, reduces lamp and fixture output. The units are mounted on cross-arms attached to 60-foot "monotube" steel poles. Two smaller floodlights are used to illuminate the scoreboard at the northwest end.



**FAN'S-EYE VIEW** of Fawcett Stadium showing the strategic situation of poles.



TWO VIEWS OF THE MAUMEE, OHIO, GYM are shown here. Above you see the permanent bleachers under which are housed the girls' locker and shower rooms. Across the floor (below) is a row of telescopic gym seats which accommodates 450 spectators and folds against the wall when not in use. Like most modern plants, the Maumee gym features an electric scoreboard and the swing-down type of basketball backboard. The main floor is 74 by 44 feet.





# GYMNASIUM FOR 450 PUPILS AND 1,000 FANS

By Harold H. Eibling

A few details on the model high school indoor athletic plant at Maumee, Ohio

Harold H. Eibling, superintendent of schools at Maumee, Ohio, passes along a few details on the layout of the new high school athletic plant.

**T**HIS year 450 boys and girls in Maumee, Ohio, a metropolitan community of 5,000 inhabitants, are attending high school in a beautiful, brand-new building, built to accommodate 600 students.

Like all modern high school buildings, Maumee has a completely-equipped gymnasium, affording everybody the opportunity to play in an atmosphere that is physically wholesome, mentally stimulating and socially sound.

Not only does the gym possess adequate space and facilities for our present student body, but it has been built large enough to accommodate the increased enrollment we expect in the future.

Seating facilities have been installed for 1,000 spectators, or one out of every five citizens of the community. By referring to the pictures, you will notice that one side of the gym has a permanent balcony which seats about 550 people. On the opposite side is a row of telescopic gym seats that fold against the wall when not in use. These seats accommodate about 450 spectators, bringing total capacity up to the aforementioned 1,000.

The beauty of this arrangement is that it takes one man only about ten minutes to drop the seats. They are on rubber rollers so that they do not mar the floors.

The floor itself is an iron-bound maple hardwood surface that has given us no trouble since installation. It has been finished nicely with Seal-O-San. We use the floor for dancing several noons a week and sometimes during the evening, but the finish has withstood all abuse. We apply a new coat twice a year. The interior walls are cement-cinder block with salt-glazed brick tile wainscoting to a height of six feet.

Our main basketball floor is 74 by 44 ft., has two 35 by 60 ft. cross-courts which may be used for intramural and physical education games and is equipped with Medart backstops. At some future time we may erect some sort of dividing line between the two cross-courts so that one court can be used for girls' physical education and the other for boys' activities. However this will

wait until increased enrollment demands it.

It is somewhat difficult to give a good description of the locker, shower and dressing room facilities, but an idea of the boys' locker room may be gleaned from the plan below. The girls' locker and shower rooms are located under the permanent seating balcony and are reached from the gym by the stairway shown in the right-hand corner of the pictures.

The locker room is 47 by 18 ft., and is equipped with fifty-two 12 by 12 by 72 in. lockers, three hundred and twelve 7½ by 12 by 36 in. lockers and thirteen benches 5 ft. 9 in. long. The room is excellently laid out and houses the girls' physical education instructor as well as the shower rooms. As in most schools, the girls have individual dressing and shower rooms.

The boys' locker room contains the physical education director's office, a varsity team room and a uniform room. It has about the same number and type of lockers as the girls' room but longer benches. Instead of the 5 by 9 size, of which there is only one in the room, these benches, seven in all, come 8 ft. by 7½ in.

The shower room is the run-through type wherein the boys enter through one side and go out the

other. Temperature is controlled from lukewarm to warm and tapered off to cold when the boys are ready to leave. We provide towel service, both for our physical education classes and teams.

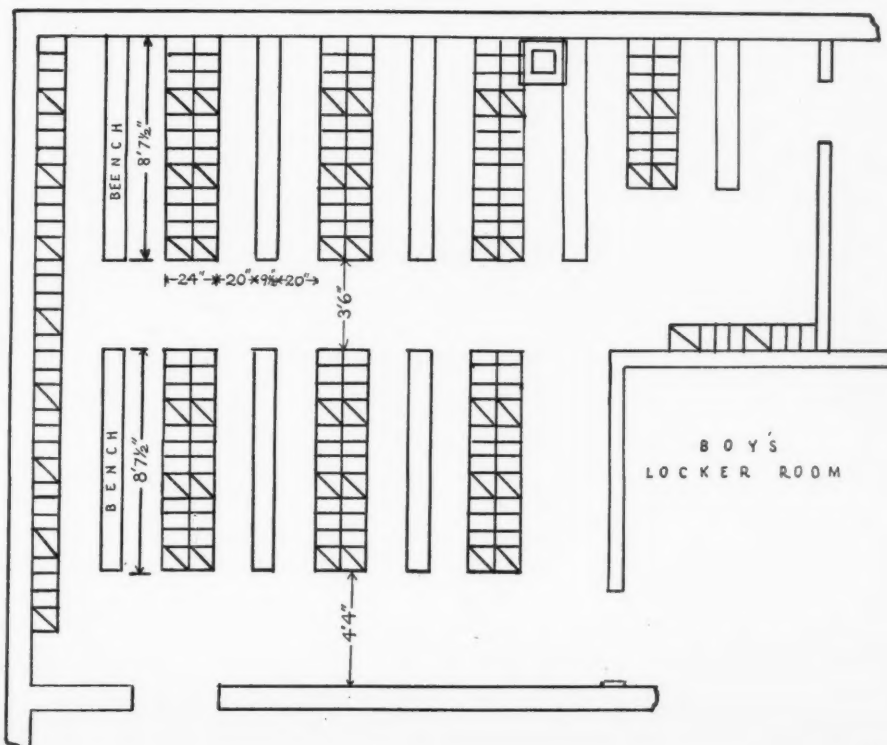
Both the girls' and the boys' rooms are equipped with Durabilt lockers in the six to one ratio (six half-sized lockers to one full-sized locker). Each room accommodates 300 or more students. Since the school was built for a 600 maximum, this is about the top capacity.

The team room is 22 ft. 9 in. by 11 ft. 9 in., and comes equipped with thirty-six 12 by 12 by 60 in. lockers with sloping tops, and one 2-ft., one 4-ft., one 6-ft. and two 8-ft. benches.

Our equipment room is located on the same floor level as the gym so that all types of equipment such as parallel bars, etc., can be moved directly into this room when clearing the floor for basketball.

As far as outdoor facilities are concerned, our athletic plant takes in a football field, a concrete stadium and a cinder running track back of the school building. We play all our football games at night, using giant reflectors for the purpose. The entire athletic field is enclosed with an eight-foot fence.

Naturally we are very proud of our modern, streamlined plant.





ONE of the finest features of the athletic plant building program of the past few years has been the part played by architectural concrete in bringing modern, functional design to a once scorned type of structure. Economy of concrete construction has frequently saved stadium programs from abandonment, and it has at times permitted purchase of better equipment and facilities.

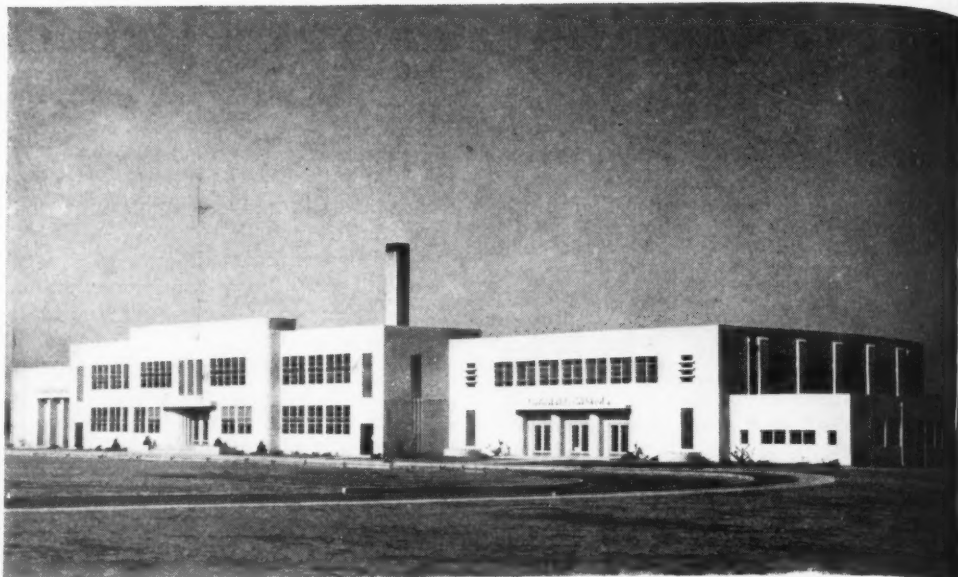
One of the largest athletic plants of this type in the country devoted to high school sports is shown below. Comprising a large stadium and a fieldhouse, both of architectural concrete, the layout provides Dallas, Tex., high schools with play facilities for all competitive sports from football to boxing.

The stadium, at the moment, consists of two grandstands 135 by 165 feet, seating 23,457 spectators. When the arch of the horseshoe is completed at some future date, capacity will be raised to 40,000. The fieldhouse is 125 by 165 feet and seats 3,000.

The football field, a perfect sodded oval in the center of a cinder track designed to A.A.U. specifications, is flanked by the two concrete grandstands. The track is a regulation quarter mile loop with a 220-yard straightaway stretching out along the west stand.

The stadium is free of steps and stairways. Easy ramps of concrete leading from broad vomitories are designed to permit exit of a capacity crowd in ten minutes. The ramps open onto concrete walks beneath the stands where there is ample space to shelter the entire crowd in case of sudden rainstorms. Atop the stand is a spacious press room accommodating 100 reporters and observers.

The floor of the fieldhouse provides space for a regulation basketball court which is also marked out



Photos courtesy Portland Cement Assn.

## SPORT CLOTHES OF CONCRETE

for volleyball, tennis, wrestling and boxing. The building contains shower and dressing rooms, a first-aid room and complete comfort facilities.

Completing the layout in a 12½ foot ornamental concrete fence which surrounds the entire plot.

Although there was no provision for the hiring of skilled labor on the project and labor crews had to be trained for specific jobs, it is agreed that no excuses need be made for the construction. An exceptionally good execution of the plans in concrete was achieved, demonstrating that concrete, known to be practical and economical building material in the hands of capable contractors, is equally satisfactory under proper supervision even when unskilled labor and untried labor is used.

In design the entire plant is modern, the various units carrying similar motifs into a harmonious ensemble. For the most part decora-

tive detail is confined to simple geometric treatment at pilaster terminals, and to sculptured bands symbolizing games and sports.

Beautiful Dothan, Ala., High School, shown above, cost the city only \$200,000. It is a complete building, modern in design and plan, spacious and comfortable. What is more, it allows for future growth.

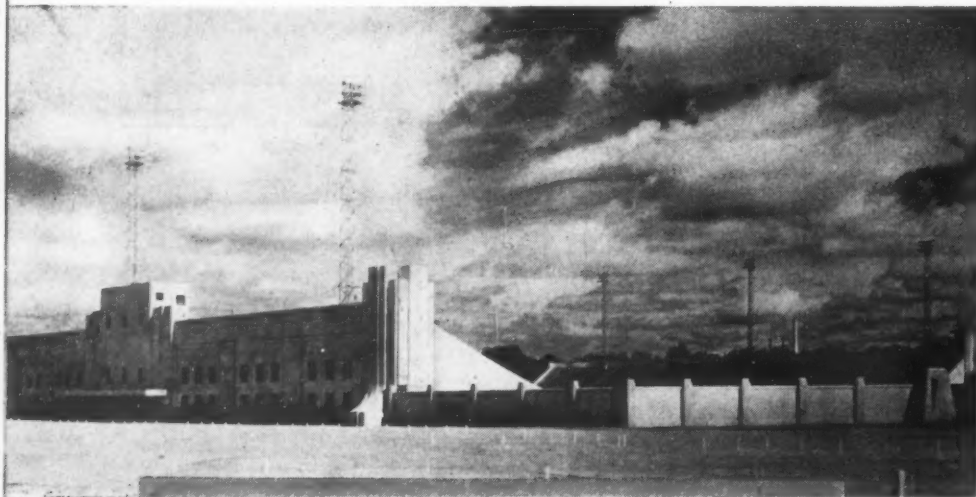
In the main facade are the entranceways to three different functional units: the auditorium at the far left, the classroom section in the center and the gymnasium with its one-story shoproom appendage at the far right.

The gym unit, like the others, is allowed to express its purpose in the exterior design, with windows arranged where needed without regard to preconceived ideas of balanced masses and details. Harmony depends upon the use of concrete as a flowing, continuous material of uniform texture and color.

Concrete walls in the basement are 12 inches thick; 10 inches in first-story walls and 9 inches above. The forming material for the main facade and the two sides of the building was ¾ inch plywood.

No money was spent on ornamentation. The details are simple and appropriate motifs that are easy to form by ordinary methods. The only complicated forms used were for the lettering, which was precast and set in place over auditorium and gymnasium canopies. The lettering may be discerned in the illustration.

Because of the great length of the main facade, expansion joints are located between the main building and the auditorium and gymnasium.



## TWO MODERN GYMNASIUMS

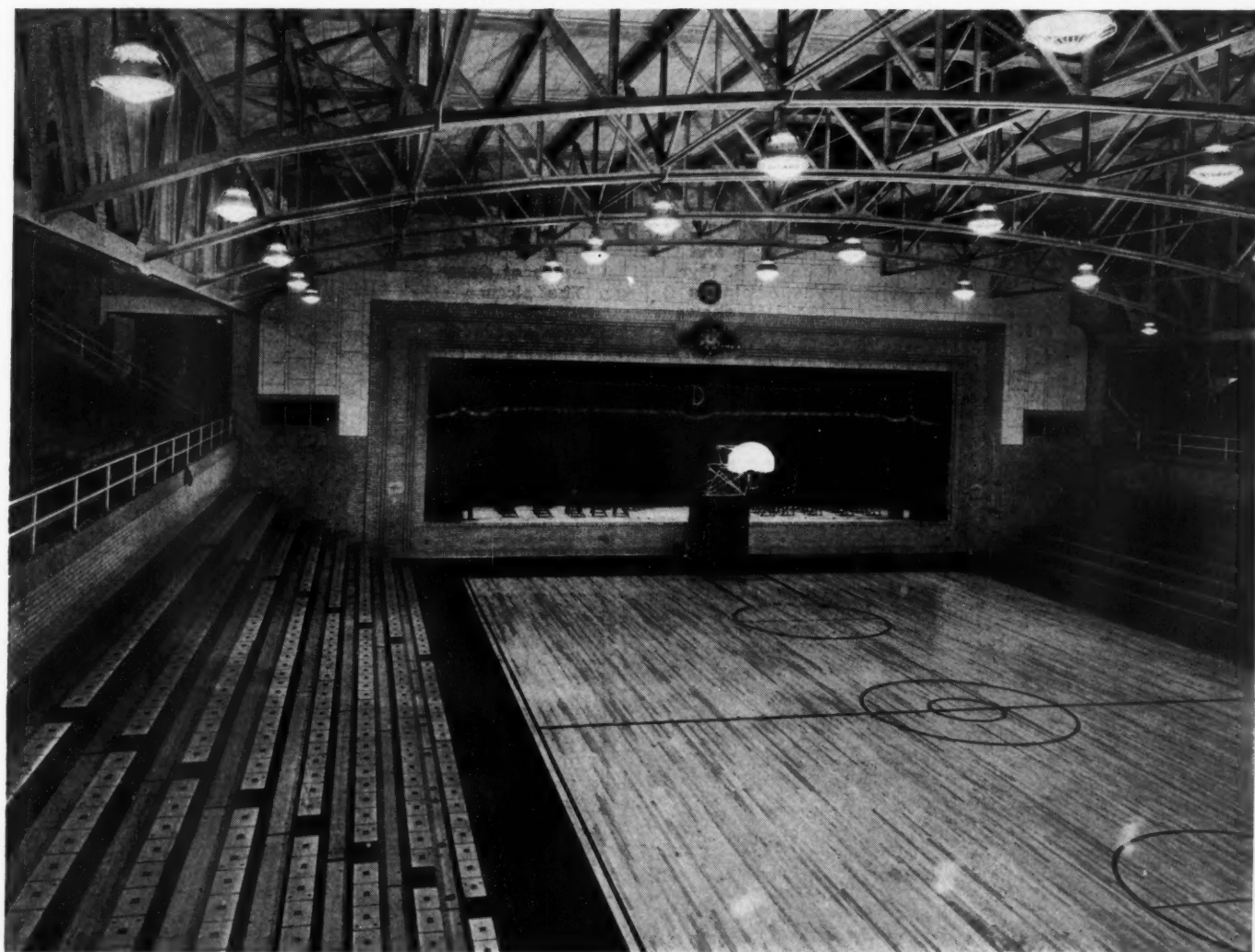
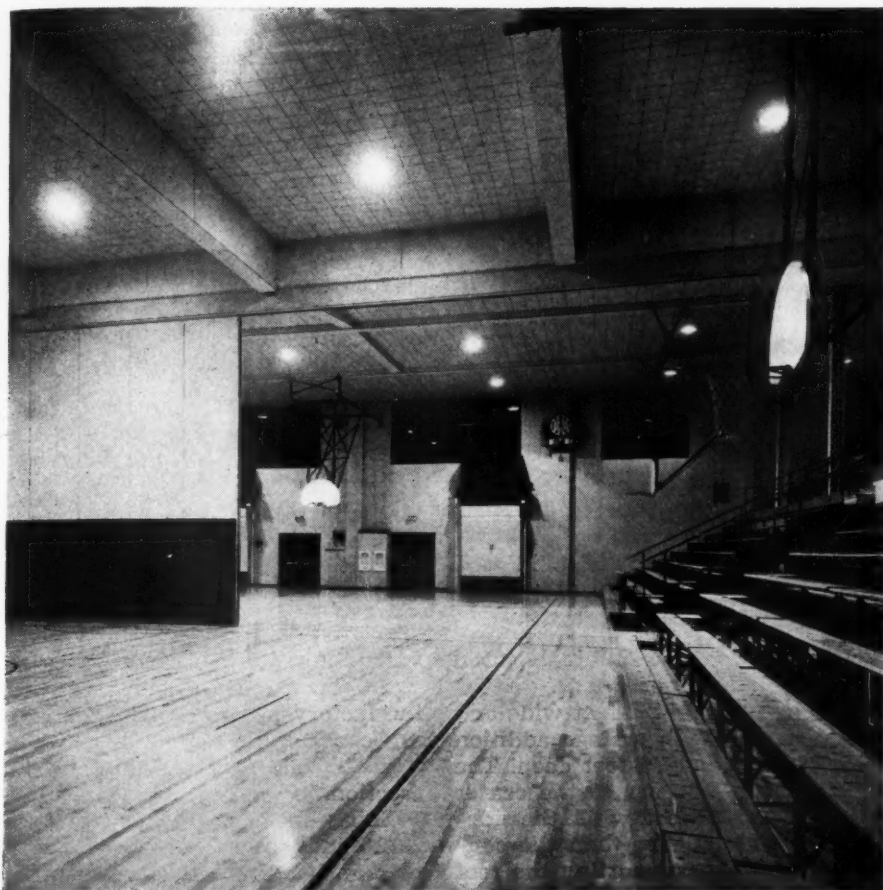
**H**ERE you have the *ne plus ultra* in the way of high school gymnasias: the LaSalle-Peru Township plant at LaSalle, Ill. (left), and the Decatur, Ill., gym (below).

Both these gyms feature electric scorers and timers, the latest fan-shaped backboards and nine-tier Fold-A-Way bleachers, which, combined with permanent built-in seats, permit maximum play areas and cross-courts. Underneath the bleachers, in both these layouts, are shower rooms and offices.

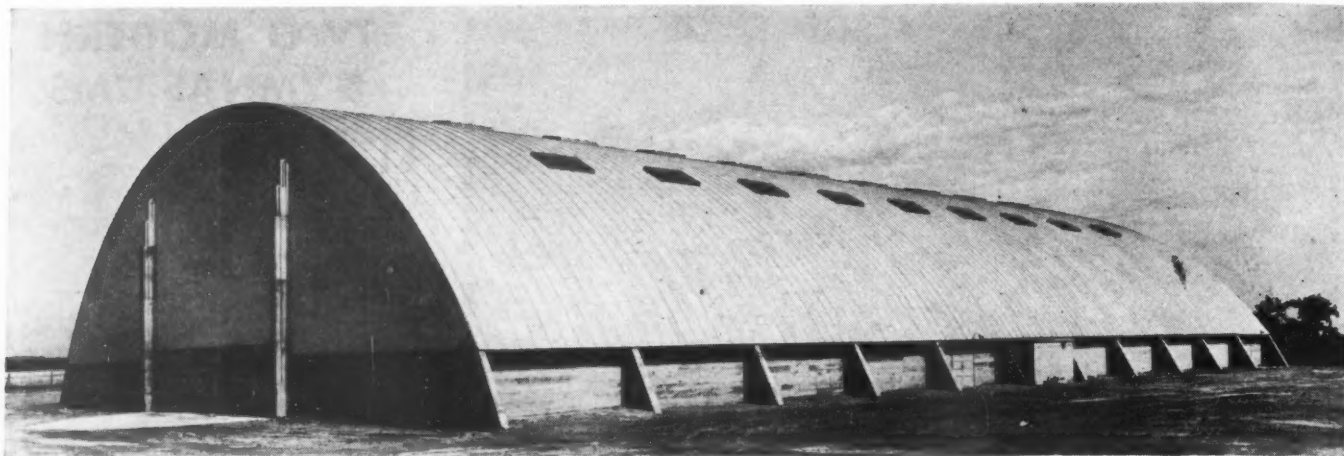
In the LaSalle layout, an electrically-operated, soundproof folding partition sets off the boys' gym from the girls'. As you may note, both gyms are completely equipped for basketball. During the games the floor is roped off.

In the Decatur layout it is interesting to note the use of rubber treads on the seats, in the aisles and around the playing floor. These rubber sheets provide sure footing for the spectators and save wear and tear on the floor.

Photos courtesy Universal Bleacher Co.







Photos courtesy Unit-Structures, Inc.

## A LARGE-SIZE, LOW-COST SPORTS SHED

By M. C. Hanisch Jr.

**W**HAT fair-sized high school or college would go without a fieldhouse if the cost were not prohibitive? As one of the laboratories in which the educational program of physical activity is conducted, fieldhouses offer a medium for the incorporation of a greater program of varied activities.

Unfortunately fieldhouse construction has always been a very expensive proposition, due to the unusually large roof span involved. Architects could never figure out an economical solution to this problem. Today, however, with the perfection of Unit glued laminated arches, it is possible to build a fieldhouse for less than \$30,000. That isn't hay, you may say, but it's a bargain when you remember what you're getting.

The fieldhouse at Gustavus Adolphus College, for example, represents an investment of slightly more than one dollar per square foot of floor area. Built at a total cost of only \$27,892.32, the building per-

sonifies the latest in high-grade low-cost indoor sport sheds.

The building is 122 feet wide and 220 feet long with a stage addition 80 feet wide and 36 feet deep. The height from the floor to the center of the roof is 36 feet, while the side-walls are not higher than the concrete buttresses supporting the roof arches, which are seven feet high. Despite the fact that the building was erected during the winter (last year), it took only a little over 30 days to complete it.

The design used was—and is—the most economical method of construction known to span a large

building without intermediate supports. Each span was made up at the factory in two halves, eliminating considerable assembly work at the site and thus speeding up the erection.

Thirty-four 10-inch wide and 13/16 inch thick laminations were used in bending and glueing up an arch section. This, of course, could only be accomplished with specially designed equipment. After the completion of the glueing operations, the arches were planed, stained and varnished, providing a neat finished appearance not usually obtained with other methods of structural framing.

The building was intended for general recreation, sports of all kinds, conventions and a pageant hall. Since it was going to be used for ice skating and hockey games throughout the winter, no floor was laid down.

The bleachers, which were not in-

**THE SHOTS BELOW** represent the "before" and "after" stages of the George B. Myrum Fieldhouse at Gustavus Adolphus College. The picture at the left shows the completion of the first arch. An interior view of the finished shed is shown at the right. The arches have a clear span of 122 ft. and are spaced 20 ft. on center. Skylights provide an even distribution of light.





# WHAT IS THE BEST PLAYGROUND SURFACE?

By John T. Cate

At the last meeting of the National Association of Public School Business Officials, the broad problem of playground surfacing was the subject of an extensive report by a research committee of five school business managers, headed by John T. Cate of Glendale, Calif.

**S**INCE large sums of money are expended annually in the construction and maintenance of playgrounds, it is necessary for school administrators to be familiar with the merits and disadvantages of the various types of playground surfaces available for their use. It is essential that they understand the qualities desirable in a playground surface. Although other factors such as cost are important, it is obvious that the surface, if satisfactory, must be suitable and adapted for the physical education program proposed. The final judgment of the playground surface rests entirely in the extent to which it meets this test. The fact that no one surface provides all the desirable qualities probably makes the question of playground surfacing a troublesome and difficult problem.

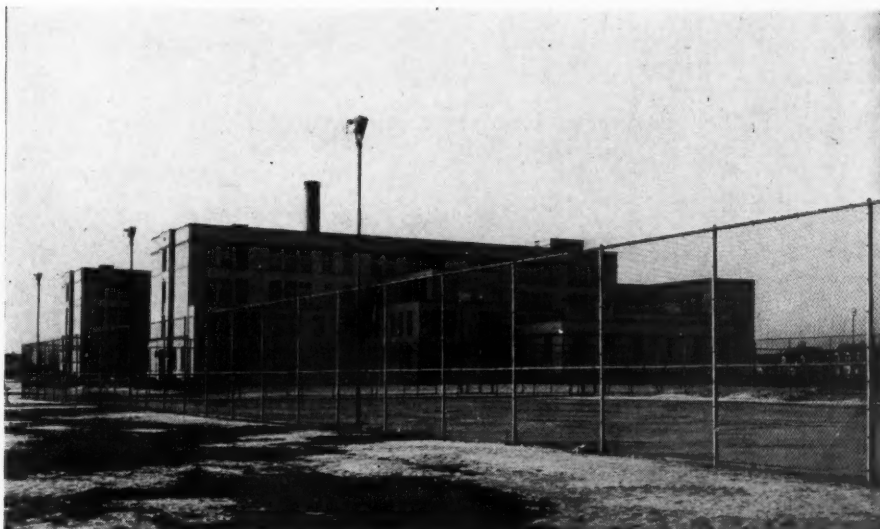
The materials in most common use include: sand, gravel and clay in various combinations, turf, cinders, crushed stone, slag, loam, concrete, various types of bituminous materials and a number of special patented surfaces. The surfaces in addition to natural earth have been grouped into general classifications under the following headings:—(1) turf, (2) sand-clay, (3) crushed stone, (4) bituminous surfaces, (5) concrete, (6) special patented materials.

Data obtained from various sections of the country indicate the following percentages of surfaces in use: natural earth, 37 percent; turf, 18 percent; sand-clay, 21 percent; crushed stone, 4 percent; bituminous surfaces, 13 percent; portland cement concrete, 4 percent; miscellaneous surfaces, including saw dust, stabilized soils, and anti-dust treatments, 3 percent.

In determining the best surfaces or combination of surfaces to use under the prevailing climatic conditions, the type of activity to be conducted must, of course, be given first consideration. The location and size of the areas to be surfaced, the extent of the playing season, local tastes, habits and traditions are all factors involved in the decision.

Another factor of increasing im-

**Bituminous is recommended for intensively used areas and for all special game courts**



Courtesy Wickwire Spencer Steel Co.

**MODERN PLAY AREAS** are invariably enclosed both as a safety precaution and as a means of preventing loss of equipment. Above is shown a 12-ft. fence that Kenmore, N. Y., Senior High School uses as a tennis court enclosure during the warmer months. In the winter this area is flooded and utilized for ice skating.

portance is the suitability for flood-lighting as there is undoubtedly a growing tendency for continuing the use of school playgrounds after school hours for general public recreational centers. While this factor has not assumed any great importance as yet, some attention should be given to the absorption power of the surface, effect on glare, reflective power, etc.

The following elements are generally considered important in any good playground surface: cost, durability, resilience, non-abrasiveness, firmness, freedom from dust, cleanliness, smoothness, good drainage, utility and good appearance.

## Surface ratings

Factors which also must be considered are: number of injuries, freedom from dust, softening and heat absorption during hot weather, effect on play activities, effect on students' shoes, effect on students' clothing, and effect on students' athletic equipment.

The properties which are possessed by any surfacing may be assigned relative values on the basis of the extent to which each particular surface factor is desired. Using the factor 13 for an ideal surface, we find that the surfaces in use have the following rating: bituminous, 27; concrete, 39; turf, 40; sand-clay, 47; natural earth, 56; crushed rock, 64.

As costs on all engineering work involve the use of power equipment,

and vary to a certain extent with the amount of area involved, a typical playground of approximately 50,000 square feet has been assumed for purposes of developing relative initial costs of the various types of surfacings. The following costs unless otherwise indicated are now in effect in Southern California and are included for the purpose of showing the relationship of costs of the various surfaces and not as an indication of what actual costs may be in other districts where commodity and labor may be considerably different.

With the exception of graded natural earth, the costs given do not include grading:

	Cost per thousand sq. ft.
Graded natural earth .....	\$ 7.50 to \$15.00
Turf .....	10.00
Sand-clay and crushed stone ...	20.00 to 25.00
Bituminous .....	30.00 to 40.00
Concrete .....	125.00 to 175.00
Stabilized soil.....	20.00 to 30.00
Oil .....	3.00 to 8.50
Calcium chloride...	2.00 to 5.00

Playground surfaces as well as buildings and equipment suffer physical deterioration which goes on every day of the year until such a point is reached that it involves an economic loss to continue the surface in use without complete replacement. If this physical deterioration is, to a large extent, counteracted by a liberal repair policy, efficient service will be assured and

(Continued on page 24)



Photos courtesy Benjamin Electric Mfg. Co.

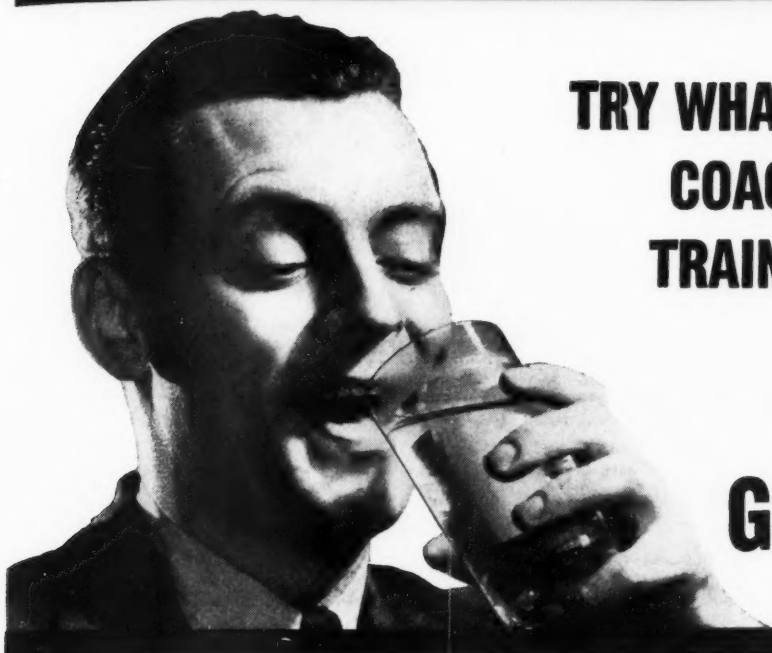
ABOVE is shown the athletic field at Etowah County High School, Attala, Ala. Illumination for night football is provided by forty-eight 1500-watt floodlights mounted on eight 65-foot poles. These poles (four on each side) are spaced eighty feet apart and carry six lights each. The wiring, in approved fashion, is carried underground.

BELOW: The illumination for the Ventura Junior College gym is supplied by thirty-six ceiling-type glassteel diffusers, using 1000-watt lamps and two-piece ceiling guards; and ten ceiling-type dome reflectors, with 200-watt lamps, which are used as auxiliary bleacher lights. All these units are mounted twenty-two feet above the floor.





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2. Then, two tablespoons (2 envelopes) a day. Take after game or practice period, preferably after shower.
3. If an individual shows loss of weight, increase the feeding to two extra tablespoons a day.
4. The recommended way to take the gelatine is in plain water (room temperature), or grapefruit juice, or grapefruit juice and water may be mixed 50-50; 4 oz. of grapefruit juice and 4 oz. of water. Pineapple juice may be substituted for grapefruit juice.
5. HOW TO MIX: (a) Pour onto the liquid 2 level tablespoons (2 envelopes) Knox Gelatine. (b) Let liquid absorb the gelatine. (c) Stir briskly and drink before it thickens.

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Courtesy Crouse-Hinds Co.

## LIGHTING STANDARDS FOR NIGHT FOOTBALL

By Ralph A. Piper

Ralph A. Piper, assistant professor of physical education at the University of Minnesota, has made a number of nation-wide surveys on floodlighting. At present he is attempting to develop a set of standards for lighting football fields.

**T**HE 46 items which follow have been sent to a group of experts in the field of illuminating engineering with a request that each item be rated as *approved* or *not approved* as a standard.

1. The lighting system should be installed in conformity with sound principles of reasonable cost, thrift and economy. Quality should be commensurate with cost.

2. The system should be installed in complete conformity with state and local laws and building codes.

3. The system should be constructed with a maximum provision for safety.

4. The system should be functionally adequate and suitable for many years of service.

5. The system should be constructed to meet the requirements of football games in accordance with standard rules under which games will be played on the field.

6. and 7. The following are recommended as minimum standards for connected kilowatt loads:

Class	No. Poles	Units Per Pole	Recommended Total K.W. Load 10% Over Voltage	Minimum
A.	10	10	174	139
	8	12	167	139
	6	16	167	146
B.	10	8	139	104
	8	10	139	111
	6	14	146	104
C.	10	6	104	70
	8	8	111	70
	6	10	104	73
D.	10	4	70	56 (8 poles 32 units)
	8	5	70	
	6	7	73	

8. The average level of illumination in the center zone should be as great or greater than in the side zones.

9. The average level of illumination in the side zones may be less than in the center zone by a maximum of 25 percent.

10. Glare should be reduced to the point that will allow a player to follow the flight of the ball while looking into a light source.

11. Projectors should be adjusted so that the glare point is below the level of the lowest spectator seats on the opposite side of the field.

12. There should be an approximately even distribution on any line lengthwise of the field so that there are no dark areas between poles. The maximum fluctuation in foot candle intensity along any such line should be 25 percent.

13. All parts of the field should receive light from more than one source.

14. Light should be distributed so that all players at any place on the field receive light from projectors on both sides of the field.

15. The light beams from each projector should overlap light beams from projectors on either side of it and on the opposite side of the field.

16. The ceiling of light should be high enough so that the ball will not be lost to the sight of players and spectators during high passes or punts.

17. Wooden and metal poles are equally satisfactory as far as lighting efficiency is concerned.

18. Poles should be located at least 15 feet from the sidelines.

19. All poles should conform in dimensions, setting and treating specifications to accepted standards such as those established by the Western Red Cedar Assn., the National Electric Light Assn., or the American Standards Assn. for wooden poles, and

specifications of the Union Metal Manufacturing Co. for metal poles.

20. The poles should be long enough to allow all projectors to be mounted at least 40 feet above the ground.

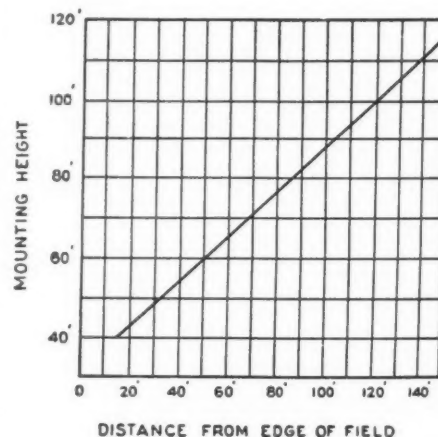
21. The number and location of poles should conform to the following standard layouts.

Distance from Sidelines	No. of Poles	Spacing between Poles
15 to 30 feet	10	75 feet
30 to 75 feet	8	100 feet
over 75 feet	6	150 feet

22. The end poles should be located on the goal lines (extended).

23. No floodlights should be so mounted along the ends of the field that it throws light lengthwise of the playing area.

24. The mounting height of projectors should be in ratio to the distance from the sidelines in accordance with the following chart, 40 feet being the minimum:



25. Narrow beam spread projectors, 30 degrees or less, should not be used less than 75 feet from the sidelines.

26. Where the distance between poles and the nearest sideline is be-

tween 30 and 75 feet, medium beam floodlights should be used with increasingly wider beam units used as the distance from the sidelines decreases.

27. Floodlights with wide beam-spreads, over 90 degrees, should only be used where the distance from the poles to the nearest sideline is 30 feet or less.

28. Open type projectors (without cover glasses) should be used when poles are located within 30 feet of the sidelines.

29. Projectors with or without cover glasses may be used at any distance from the sidelines.

30. If cover glasses are used, their absorption factor should not be over 10 percent.

31. The minimum reflection factor of internal projector surfaces should be at least 70 percent.

32. Painted reflector surfaces should not be used in floodlights for a football field.

33. Not over one-half of the projectors in a lighting system should have specular reflector surfaces unless diffusing cover glasses are used.

34. The single lamp floodlight should be considered standard for football lighting.

35. Clear glass lamps should be standard for football floodlights.

36. Hard glass lamps should be standard for all open projectors.

37. The standard lamp recommended for football lighting units is one of 1500 watts rated at approximately 33,000 limens.

38. Lamps should be burned at approximately 10 percent over-voltage. In other words the labelled voltage of lamps should be approximately 10 percent under the line voltage at the socket.

39. The size of wire used should vary according to the distance from transformers to the farthest units and should be large enough to prevent a drop in voltage of over two percent.

40. Overhead and underground wiring are equally satisfactory as far as lighting efficiency is concerned.

41. All wiring should be located so as not to interfere with the progress of players, spectators or the ball.

42. All wiring should be well insulated and should be installed in conformity with standards of the National Electric Safety Code.

43. The transformer or transformers must have a total capacity not less than the total kilowatt load of the system at 10 percent over-voltage.

44. Proper circuit-breaking devices should be installed in conformity with the National Electric Safety Code.

45. Fuses or circuit-breaking devices should be provided controlling the lamps on each pole as a unit or for each individual projector.

46. Control switches should be located so as to be easily accessible but should be kept locked except when they are not being operated.

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# FIGURE SKATING'S FOUR BASIC EDGES

By Julian Whitener

These demanding taskmasters insist upon hours of practice for only approximate perfection

**S**CHOOL figures are a phase of figure skating about which the average sports enthusiast knows little and cares less. They consist of tracings made on the ice, using every possible edge, direction and turn that can be made with a skate. They are done in figure-eight fashion and are the most difficult and most important part of figure skating. In fact they are the basis for all figure skating. In competition, they count for two-thirds of the total marking, while free skating counts but one-third.

To those competitive skaters who must skate them, the school figures are dramatically, vitally alive. They are the demanding taskmasters which insist upon hours of practice for only approximate perfection.

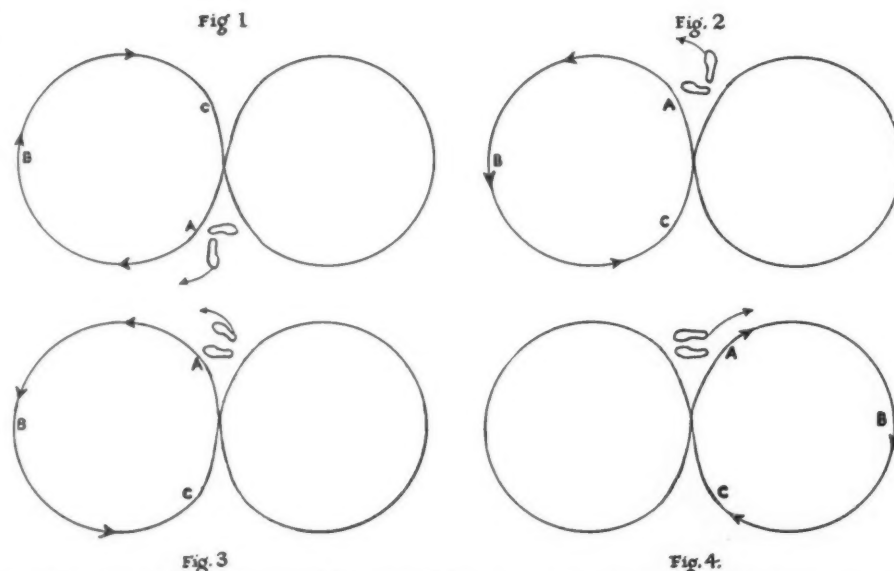
The four fundamental figures which must be learned first are the outside forward, the inside forward, the outside backward and the inside backward figures of eight. To skate these figures well, one must be relaxed and yet intensely concentrated. Every muscle, every nerve must be controlled to do just the right thing.

Many beginners forget or ignore the fact that the figures must be started from a standstill with but a single stroke. They think they can learn to do the figures from a moving start and then afterwards learn the correct way of starting. Experienced skaters will agree, however, that it is best to start correctly from the beginning and learn the figures with the proper start.

**Outside Forward 8:** In taking off for this figure, the right arm is held across the chest. The boy stands at the very center of his future figure 8 facing west, with his feet planted at right angles to each other in such a way that the heels of the skates are close together and the right foot is forward.

To pick up momentum the weight is placed on the left inside edge, the left knee bending at the same time. The boy then pushes to his right outside edge. As the left foot trails behind, the skater immediately takes a position with the skating arm across the chest. The free arm and leg are behind, in open position with the hip and leg turned out and the toe pointed down and out.

The skater finds himself traveling in a circular line bound northward. Gradually the skating knee



**THE FUNDAMENTAL SCHOOL FIGURES:** Fig. 1 illustrates the outside forward 8, Fig. 2 the inside forward 8, Fig. 3 the backward outside 8, and Fig. 4 the backward inside 8. The footprints indicate the starting point and the direction of travel. At the points marked A and C, the skating knee should be most bent while at B the leg should be straightened so that the knee is only slightly bent.

straightens, but the body is kept erect, the back arched and the weight over the heel of the skate.

At the start the right shoulder and arm are leading and the skater is facing west. As he reaches a point about northwest, however, he gradually starts to rotate his shoulders and head to the right, bringing the free arm and leg slowly forward and the skating arm gradually backward. As due north is reached, he is facing directly ahead. At this point his arms will be ready to pass each other at the waist and his free foot will be almost ready to pass his skating foot.

The skater then leans back slightly and gradually continues to rotate his entire body, so that by the time he reaches northeast he will be in a position with the left arm, shoulder and leg in front and the skating arm down and back.

He is now ready for the second half of the circle, which will be skated on the left forward outside edge. While shifting the weight of the right foot to the inside edge for the pushoff to the left outside edge, he does not stop but swings the left foot slightly behind the right foot and then forward. The second circle is skated exactly like the first.

In order to finish each circle, the skater must hold a strong edge. To do this he keeps the body straight, the back arched, and the hips in tightly directly under his shoulders.

He then leans in toward the center of the future circle. As he does this the employed (skating) shoulder is lower than the free shoulder, owing to the inclined angle of his body.

**Inside forward 8:** Most beginners have less trouble with the inside forward 8 than they have with the outside edge. The foot position for the pushoff is exactly the same except that this time the skater is going to hit the inside edge of his right skate and travel in a counterclockwise direction.

The skater stands at the center of his figure 8, facing north. This time the left or unemployed shoulder and arm are placed in front. At the same time the right or skating shoulder is pressed back. This arm position is just opposite to that employed in the outside edge.

The skater next bends his knees and strikes off onto his right inside edge, holding his left leg behind and slightly inside the tracing with a well turned-out knee. This position is maintained until the skater gets about halfway around the circle. The free foot is then brought from back to front close to the skating foot and simultaneously the right shoulder starts to shift from back to front and the left shoulder from front to back.

Upon returning to place in perfect position for the next pushoff, the free foot, still turned out, is carried directly in front of the skating

foot and the shoulders are twisted far around so that the right one is in position to lead off on the left edge. The balance is just back of center throughout.

**Backward Outside 8:** In taking off for this figure, the skater faces north with the weight on the left inside edge and the right foot held in front about seven inches away, toe turned out. The left arm is bent in front of the body and the right (employed) arm is stretched behind. The skater gazes toward the north and keeps facing that direction while he pushes off with his left foot. His body, however, turns during the pushoff so that he moves backward toward the north.

The weight is kept on the ball of the foot and the body leans slightly forward, back arched, so that the skater will not fall backward. The left or free foot remains in front, with the knee turned out, the toe pointed down and out, the free arm forward, and the right arm and shoulder pressed back.

The head then gradually turns to the left, in the direction of motion. When the skater reaches northeast, the body gradually rotates. This brings the right or skating arm forward and the free arm and leg pass backward. At the same time the head turns farther to the left in the direction of motion, until the skater is looking under the free shoulder behind him, enabling him to see where he is going.

To change feet, in the second half of the circle, the skater brings his free foot forward momentarily, then passes it back as the right foot goes over to its inside edge. At the same time the skating knee and body are straightened. The skater then leans slightly forward and into the next circle. The second circle is performed in the same way as the first.

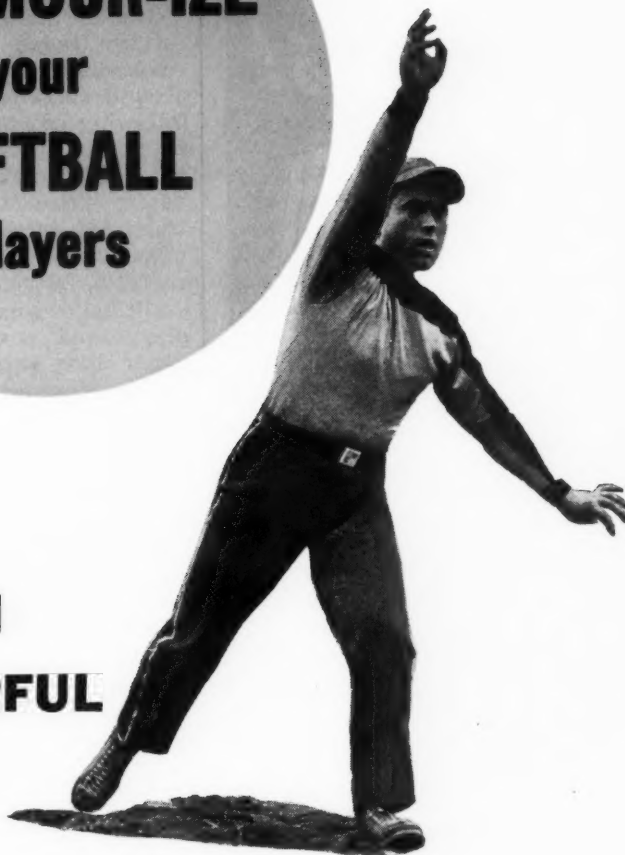
**Backward Inside 8:** This is by far the hardest of all the eights. To take off the skater faces north, feet parallel and the weight on the left inside edge. The right arm is held across the chest and the other member down at the side. For momentum the skater bends his knees deeply, turns the body and right foot momentarily to the left and then springs smoothly but powerfully to his right back inside edge, aiming eastward directly to his right.

After taking off, the skater immediately assumes a position in which the right arm is forward, the free arm back and the body leaning slightly forward with the weight on the ball of the foot.

When the skater reaches a point  
(Concluded on page 25)

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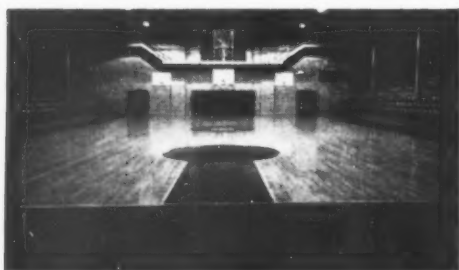
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## Playground Surfaces

(Continued from page 15)

the useful life of the surface greatly extended.

The estimated approximate useful life, based upon a program of reasonable maintenance of playground surfaces, indicates that the following economic life may be anticipated: graded natural earth, 1 year; sand-clay, 8 years; turf, 10 years; crushed stone, 10 years; stabilized earth, 10 years; bituminous surfaces, 20 years; concrete surfaces, 30 years.

Ultimate success in the use of playground surfacing depends as much upon successful maintenance as on successful construction methods. Maintenance which tends to destroy the uniformity of the surface will inevitably shorten its life. Repairs to surfaces should be made with materials similar to those employed in construction, and methods employed in using the materials should be substantially identical with the methods adopted in construction.

Assuming that the work is begun at the proper time, the cost of maintenance in the average district would be as follows:

	Cost per thousand sq. ft.
Graded natural earth	\$7.50 to \$10.00
Sand-clay and crushed stone	8.00 to 10.00
Bituminous	1.00 to 2.00
Concrete	.50 to 2.50

### Analysis of materials

The following general conclusions were reached concerning the various surface materials:

**GRADED NATURAL EARTH:** Despite the apparent disadvantages of natural-earth playgrounds, about a third of the schools are using this material for surfacing. Its use is largely a matter of financial necessity rather than of choice.

Playgrounds of this type are naturally more susceptible to washing and rutting from weather conditions and consequently carry increased hazards of safety to the players.

**TURF:** It has generally been conceded that turf is the most ideal surface for most forms of children's play as well as for many highly organized games. However, its use is not practicable on intensively used playgrounds of less than two or three acres due to the absolute necessity of giving the surface periods of rest.

This objection, coupled with the high cost of maintenance, generally prohibits its use to any large extent for general playground activities. However, this surface may be used to a large extent for specialized activities such as football. At least a

section of a fairly large playground should be allocated to this surface.

**SAND-CLAY AND CRUSHED STONE:** While a combination of sand-clay surface of some type or a crushed stone surface is more generally employed than any other type of surfacing, the use of these surfaces is governed by the cheapness and availability of the materials rather than by their merit. The bad features of this material are: excessive dust, number and severity of injuries, and wear on shoes, clothing and equipment. These, together with the excessive maintenance that is necessary to eliminate the effects of washing from rain, indicate the surface is not entirely satisfactory. Its main advantage seems to be that it eliminates to a certain extent the muddy condition of natural graded earth after rain.

**BITUMINOUS SURFACES:** The use of bituminous surfaces is particularly adapted to intensively used playgrounds and to all special game courts. It can be used throughout the year in all kinds of weather. If properly laid, the maintenance costs are negligible. Wear on shoes, clothing and equipment is no greater than that on natural earth and fewer injuries result from its use. It would appear that if at all possible at least a portion of the playground should be paved with this type of material.

**CONCRETE:** It is generally agreed that a concrete surface is not satisfactory for general playground surfaces. However, it is being widely used for special game courts such as tennis, handball, etc.

Objection has been raised to the excessive initial cost and, while maintenance on a properly-constructed court should not be excessive, repairs are extremely difficult to make.

It is generally indicated that the material had no particular advantages over bituminous surfaces which are considerably cheaper.

A great many specialized types of surfaces are also being used, apparently due to the availability of the surfacing material in the particular localities. These include: sawdust, shavings, tan bark, and similar materials.

The stabilization of soil was reported in some districts more or less experimentally. Developments in this field should be watched as the program of stabilization is comparatively cheap in cost and has considerable merit.

### Recommendations

It is recommended that each playground be considered on its own merits and that the physical education program which is proposed for that particular playground be the basis for determining the surfaces to be used. Attention is again called to the

fact that no one surface provides all the desirable qualities and it is, therefore, necessary to decide which are the most important qualities for a particular area and then to adopt a surface which will most nearly meet all these requirements.

The size of the playground has an important bearing upon the problem. It would appear that on intensively used playgrounds, i. e. playgrounds with a small area per student using them, the use of bituminous surfaces is probably the best solution. On large playgrounds where areas may be allocated for various games, combinations of surfaces are the most desirable. It is generally possible to engineer the lay-out so that a portion of the playground can be surfaced with bituminous surfacing of sufficient size to take care of all court activities in fair weather or rain, and the balance of the playground can be in turf, natural earth, or other types of surfacing.

## Figure Skating

(Continued from page 23)

about southeast, he begins to rotate his shoulders, arms and free leg. The arms gradually reverse positions and the free leg moves back past the skating leg, so that by the time the skater reaches a southwesterly point his body is ready for the start of the second half of the figure. Here the free arm is forward and the skating arm and free leg back.

This position is maintained back to center. At the change the skating knee is bent very strongly and the body is twisted slightly to the right for an instant just before the push-off to the left inside edge.

Beginners find it easy to look continuously at the center point, and to shift the general direction of the head slightly as they change feet. Other skaters, to insure a stronger edge throughout, like to begin at a point southeast to turn the head gradually out of the circle in the direction of motion, until they look outward and back over the free arm. Thus, when they are ready to change feet, their head is already in the correct take-off position.

In competition these figures must be skated over three times from the starting point, and the three lines must go as nearly on top of each other as is humanly possible.

If you are planning an ice skating tournament for your school, medals for boy and girl winners may be obtained by writing to Scholastic Coach, 220 E. 42 St., New York, N. Y.

State school enrollment, your name and position, school, and address. A registration coupon may be found on page 32 of last month's Scholastic Coach.

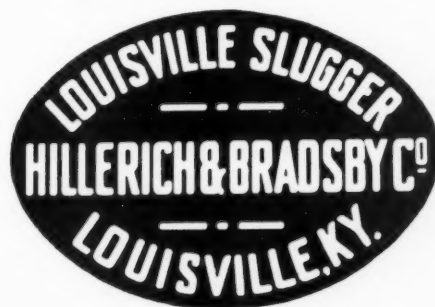
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# ATHLETIC FACILITIES CONSTRUCTED OR IMPROVED BY THE WPA, JULY 1, 1935—JUNE 30, 1940

(Shows Only Those Units Completed During This Period; Does Not Include Work in Progress)

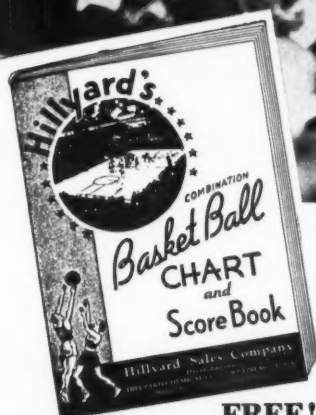
State	Gymnasiums		Stadiums, Grandstands and Bleachers		Playgrounds		Athletic Fields		Tennis Courts		Swimming Pools		Ice Skating Areas		Golf Courses	
	N*	I*	N*	I*	N*	I*	N*	I*	N*	I*	N*	I*	N*	I*	N*	I*
Alabama	13	2	35	3	33	113	75	25	41	21	11	2	—	—	5	1
Arizona	6	8	18	7	3	16	10	15	59	4	5	2	—	—	4	2
Arkansas	100	26	48	7	18	33	41	21	89	2	14	—	—	—	1	3
Northern California	8	16	87	32	32	222	32	56	216	77	15	7	—	—	6	12
Southern California	11	15	54	40	48	211	43	50	250	138	20	19	—	—	4	4
Colorado	18	18	20	24	16	84	16	51	110	26	15	3	6	—	5	7
Connecticut	—	1	14	4	25	66	29	29	71	23	9	2	8	2	3	8
Delaware	—	—	—	—	7	1	9	5	27	16	—	1	1	—	1	1
District of Columbia	—	1	—	1	—	105	4	9	33	—	—	—	—	—	1	—
Florida	18	1	53	7	63	25	65	40	205	12	13	4	—	—	4	22
Georgia	43	24	20	10	41	238	48	23	156	25	13	2	—	—	13	11
Idaho	2	9	21	7	3	25	16	9	40	—	3	—	—	—	2	—
Illinois	21	31	47	7	94	664	109	86	419	641	32	28	30	2	3	25
Indiana	14	34	34	21	83	105	80	92	234	67	20	5	9	1	7	23
Iowa	9	19	47	16	24	58	47	33	115	37	18	4	25	—	2	9
Kansas	13	5	69	11	67	45	38	38	127	36	27	4	—	—	2	4
Kentucky	36	30	31	6	33	64	41	16	102	53	13	—	—	—	4	5
Louisiana	16	14	22	3	8	44	37	25	85	13	9	1	—	—	3	1
Maine	2	3	6	3	22	4	19	22	48	5	1	1	9	—	1	—
Maryland	—	1	20	4	13	99	26	18	28	45	2	—	1	—	4	4
Massachusetts	1	12	52	32	37	248	71	113	359	110	8	13	31	16	4	8
Michigan	8	30	59	27	52	241	103	60	466	75	10	2	458	2	7	7
Minnesota	1	21	41	31	83	175	114	83	275	157	14	3	242	9	7	23
Mississippi	61	18	29	8	20	33	28	24	66	1	10	2	—	—	1	2
Missouri	29	29	29	8	95	531	66	44	138	151	16	1	—	—	5	5
Montana	11	23	33	20	70	45	82	14	158	12	30	4	49	1	16	2
Nebraska	5	10	54	35	15	30	34	32	125	25	15	12	1	—	3	3
Nevada	—	2	8	6	5	11	9	6	17	3	1	4	—	—	1	2
New Hampshire	—	—	11	6	10	25	6	26	75	17	3	8	7	2	1	1
New Jersey	—	10	37	24	93	231	104	68	335	160	10	9	5	1	—	6
New Mexico	25	12	24	9	41	56	12	16	53	2	4	1	—	—	3	5
New York City	—	7	39	1	310	59	43	16	362	60	15	3	16	9	3	10
New York (Excl. N.Y.C.)	1	9	36	13	91	145	117	26	311	70	29	8	30	1	10	7
North Carolina	85	24	50	5	126	178	135	59	196	33	18	2	—	—	10	5
North Dakota	6	10	26	17	13	178	37	12	56	17	8	5	36	1	8	12
Ohio	6	35	115	54	126	354	120	192	524	151	48	7	16	8	7	18
Oklahoma	115	49	50	7	22	1,861	38	34	172	19	31	1	—	—	3	1
Oregon	16	13	22	8	24	102	27	39	97	5	2	2	1	—	1	5
Pennsylvania	1	32	58	50	126	638	179	201	486	206	20	81	8	2	8	5
Rhode Island	—	1	5	1	10	12	19	11	11	4	—	—	—	—	—	—
South Carolina	50	18	44	10	38	154	70	24	82	4	10	4	—	—	7	8
South Dakota	2	12	26	5	14	19	19	23	55	11	3	6	6	—	—	5
Tennessee	26	20	30	10	86	97	54	30	123	6	8	—	—	—	5	2
Texas	123	37	79	31	103	63	121	168	615	33	43	8	—	—	9	21
Utah	3	6	34	15	8	107	15	21	72	16	11	5	1	2	—	2
Vermont	1	3	5	—	4	4	6	9	12	—	2	1	15	1	—	—
Virginia	1	7	22	11	101	36	41	30	95	10	4	2	—	—	2	—
Washington	19	56	52	21	81	293	84	117	225	21	17	2	1	—	11	5
West Virginia	4	12	17	5	24	94	24	9	40	3	10	2	—	—	1	1
Wisconsin	9	18	49	37	52	235	58	55	294	110	24	15	40	17	5	8
Wyoming	2	2	17	10	8	30	9	7	38	2	12	—	8	2	3	4

\*N—New Construction; I—Reconstruction, Improvement or Additions.

WORKS PROJECTS ADMINISTRATION  
Division of Statistics  
December 2, 1940



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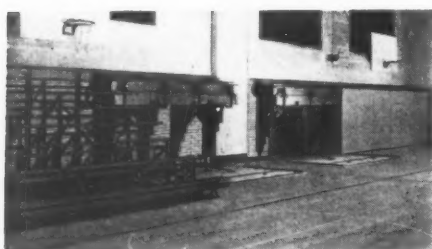
Name .....

Position .....

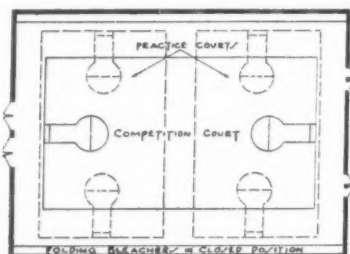
School .....

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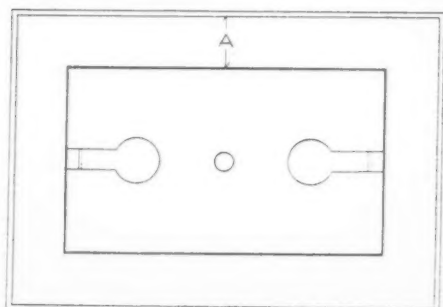
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## EVOLUTION OF THE BANK

By H. V. Porter, Secretary Basketball Rules Committee

ON MANY a high school and college basketball floor this season, spectators who have not been following the recent trends of the game are rubbing their eyes in bewilderment. Gone are the old bulky square-jawed backboards and in their place are the streamlined fan-shaped banks that were authorized by the National Basketball Committee for optional use this season.

In view of the fact that the new boards represent a radical departure from tradition, it is surprising to note the rapidity with which they are being accepted. No accurate figures are available on the exact number of installations but all signs indicate that the transition to the new board is taking place more rapidly than even its most ardent supporters dared hope.

Coaches who have not yet seen the new bank in action have a treat in store. The elimination of waste space makes the basket stand out like a beacon. Even the spectators who sit at the end of the court can now see the ball going through the net.

The board also exploits the four-foot end space, making it possible for plays to come into the basket from all directions. Players are becoming unusually skilful at going far under the backboard and then shooting with a body twist; a stunt which enables them to reach the ring from well out toward the four-foot end line.

Some of them are coming in from the corners and along the end lines to execute shots that would have been impossible with the larger boards. While the new banks have only 43 percent of the old square surface, all the needed area has been retained.

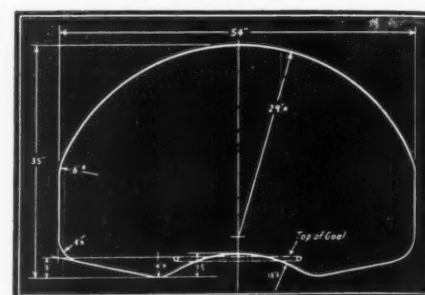
### First steps

The development of the new type backboard was probably presaged a number of years ago when a type of goal was devised that eliminated the use of the two bracing rods which ordinarily extended approximately one foot below the level of the basket. Such a goal was produced by A. G. Spalding and Bros. and later improved upon by the Schutt Mfg. Co. through the addition of special re-curved bracing rods. When the lower braces were eliminated, the lower section of the backboard was made superfluous.

But it took the basketball specialists a number of years to realize it.

They began to wake up when various athletic groups, such as the National Federation of State High School Athletic Associations, started making studies of games and equipment to find whether they were suited to modern needs. After investigating the size of the ball, the placement of the backboards, the size of the court and the distribution of rest periods, they turned the spotlight of investigation on the backboard.

As early as 1937, groups such as the Illinois Basketball Committee were making charts to determine which part of the backboard was



**HERE'S THE LATEST** in basketball backboards: the new fan-shaped bank the National Basketball Committee legalized for optional use this season. Dimensions are exactly as they appear in the rule book.

actually needed and how much of it was being used in caroms or rebounds. Other state high school athletic associations with committees similar to the one in Illinois were working with the national office along similar lines.

Between 1937 and 1940, data for thousands of games and practice periods were available. As an illustration, one member of the Illinois Committee, Athletic Director J. H. Trees of DeKalb, trained statisticians and charted the use of the backboard through an entire 32-team tournament (1938). A composite graph was made and published in a number of the state high school association bulletins and in *Scholastic Coach*. Other members of the committee arranged for the construction of modified boards in the school manual training shop and erected such boards on their cross-courts.

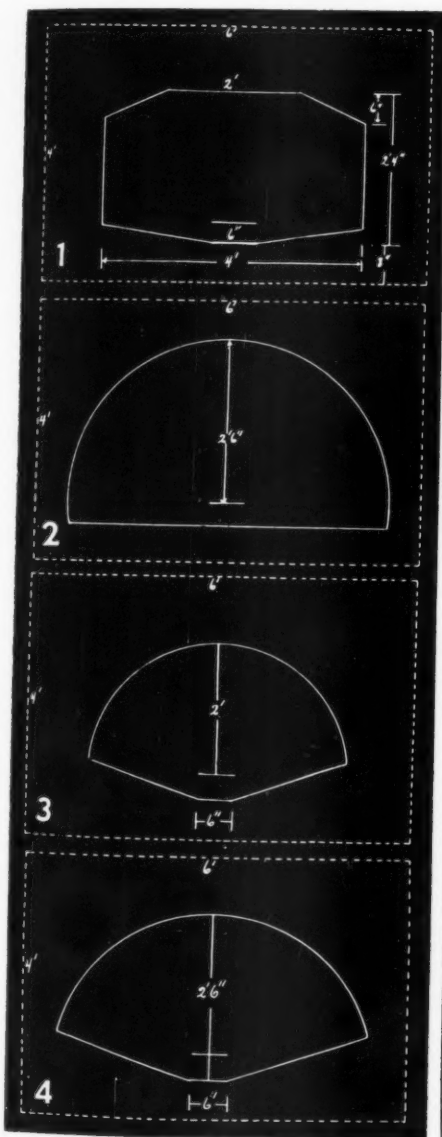
In the fall of 1938 some of the findings in connection with this problem were published in the state bulletins, and a diagram of boards



of various sizes and shapes appeared in the Illinois High School Athlete and in Scholastic Coach. Coaches all over the country were urged to continue experimentation with these proposed sizes and shapes so that the best one might be found. Because they may have some historical interest these diagrams are reprinted here.

Naturally there were difficulties. The making of the boards presented some problems and no funds were available for supplying equipment for experimental purposes. Schools and organizations hesitated to shell out for such boards when there was no way of telling whether they would ever be sanctioned. One of the larger equipment manufacturers, the Fred Medart Co. of St. Louis, became interested in the problem and volunteered to work with the National Basketball Com-

(Continued on next page)



THESE line drawings of the first experimental banks appeared originally in "Scholastic Coach" (November, 1938) and in the Illinois state bulletin.

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When you're planning to buy new equipment for your training rooms, be sure to look into the extra quality, extra savings you can get with McArthur Super-Gym and Super-Turk Towels. Student athletes like the brisk athletic rub of Super-Gyms—and you'll like the economy, a life of better than 350 uses and launderings!

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Western Representative: E. P. Finigan, 314 12th St., San Francisco, Calif.

## FIGHT ATHLETE'S FOOT the year 'round

The medical profession knows that Athlete's Foot is as prevalent in the fall and winter as in the summer. In cold weather the infection may take a less acute form, but it is just as common as ever AND SHOULD BE GUARDED AGAINST JUST AS CLOSELY. That means the continued use of Quinsana Powder.

Reports from athletic coaches, dermatologists and clinics indicate that this powder is *extraordinarily* successful in the fight against Athlete's Foot.

It creates an alkaline condition under which the Athlete's Foot fungus cannot live. Moreover, it can be used continuously without irritating the skin.

### 2-WAY TREATMENT—FEET AND SHOES

Quinsana Powder is used two ways—(1) on feet; (2) in shoes. Treatment of shoes (as well as feet) is indispensable because the Athlete's Foot fungus thrives in shoe-linings and, unless killed there, generally causes reinfection. Ointments and liquids cannot be used in shoes, but Quinsana can, because it's a powder.



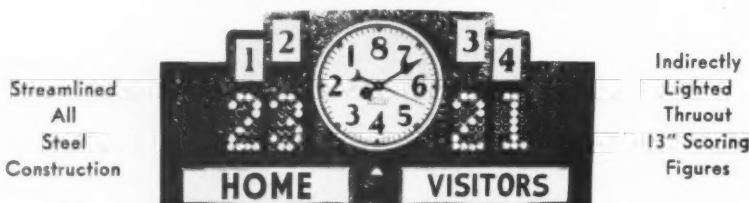
For samples and literature, address The Mennen Company, Newark, New Jersey.





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ED. B. BELL, General Manager

mittee in supplying a reasonable number of boards of the size and shape best suited to the modern game. Such boards were provided without cost.

Various summer coaching school instructors, including A. A. Schabinger, used such boards in connection with their demonstration work. One such demonstration was made at Boston College. Statistics were kept to determine whether players were greatly handicapped in shooting at the smaller backboard. At the end of a regulation game, it was found that just as many points were scored on a new board at one end of the court as on an old board at the other end. This was significant in view of the fact that the players had no previous experience with the new type board.

### Experimentation in Illinois

Similar statistics were gathered elsewhere. At the national rules meeting in 1939, which was held in New York, a pair of demonstration boards were displayed at New York University. During the 1939-40 season many high schools continued the experimentation. The Illinois Basketball Committee recommended that certain conferences in the state be authorized to erect the smaller boards and to have them considered legal during the experimental period. At a meeting in March, the same group unanimously voted to recommend to the state high school association the legalization of such boards for any high school game in Illinois.

On the strength of these activities a 16-team suburban basketball tournament was played at Blue Island in which only the new small boards were used. None of the entering teams had a chance to practice on the boards. Yet they all adjusted themselves without difficulty in the few minutes' warmup before each game. Coaches, players and spectators agreed that the new type board contained all the necessary space for banking purposes and improved the game through making possible additional maneuvering in the area behind the plane of the backboard.

When the National Basketball Committee met at Kansas City last March, all this information was available. The committee representing the high schools recommended the legalization of such boards on the grounds that a large percentage of the present space was superfluous, that elimination of such space would improve the game, that it would improve the visibility of end areas for

the spectators, and that such boards would represent appreciable economy due to their lighter weight and greater immunity to warping and twisting.

The result was the legalization of the board shown in the accompanying diagram (page 28), which is reproduced from the rules book.

### **Kansas adopts bank**

The Kansas State High School Association was the first to announce that all state tournaments would be played with the new type board and that wherever possible all other tournaments would be played on courts similarly equipped. The state high school association of Wyoming took similar action. The state associations of Illinois, Minnesota and Iowa announced early in the season that the new banks would be considered legal for any state-sponsored tournament, while a number of other states declared that although the change to the new board may not be sanctioned this year, such action would probably be taken next season.

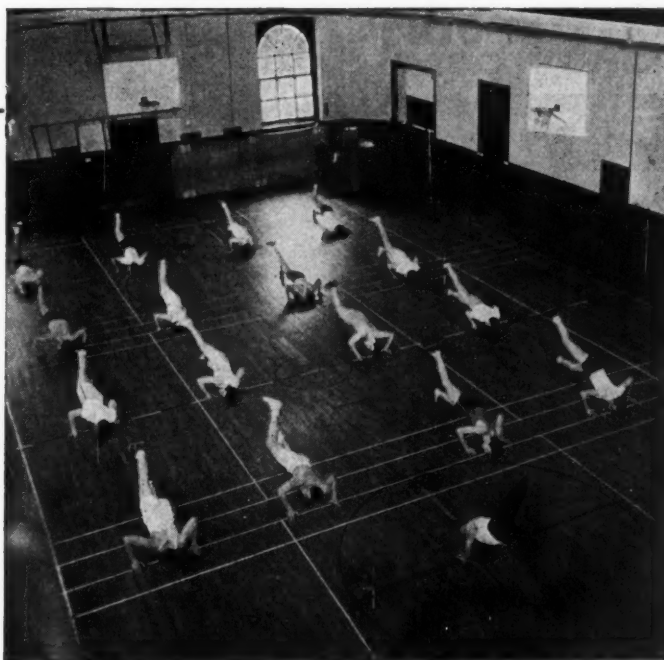
Several college conferences have likewise adopted the new board. The Big Six and the Big Seven conferences have already clambered aboard the band wagon. Even some of the professional groups have signified their intention of switching over to the streamlined banks. Madison Square Garden has used a modification of the new type board for the past several years, their banks having only a few inches of space below the level of the basket ring.

### **Aboard the band wagon**

Individual high schools have been quick to see the advantages in changing to the new type equipment. The Big Twelve Conference in Illinois, which includes most of the large cities in the central part of the state, has given the board its blessing and seven of the twelve schools have already made the transition.

In the Pike County Conference about three-fourths of the member schools have also switched to the fan-shaped bank. There are at least 20 other schools throughout the state that are definitely known to have made the change. All this illustrates what is happening in most sections of the country.

It is safe to predict that within a few years the new board will be so firmly entrenched that coaches will wonder why they tolerated all the excess weight and surface for fifty years.



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Why experiment with floor seals of questionable quality when you know what PYRA-SEAL can do? Hundreds of coaches and school boards say PYRA-SEAL is best for gymnasium floors—that PYRA-SEAL beauty and protection last longer and cost less per year. Conquers dirt and wear. Resists acids, alkalis, ink, hot and cold water. Write for catalog today!

**Approved** and recommended by the Maple Flooring Mfrs. Assn., National Oak Flooring Mfrs. Assn., and specified by leading architects.

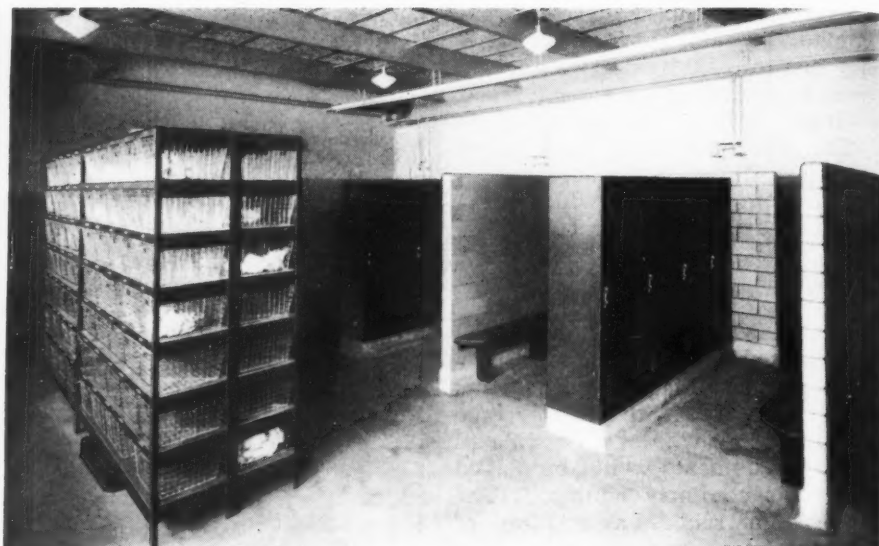
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Our Free Record Book "How To Make Stars" contains helpful charts for easy record keeping of players' faults as they occur. Free on request to any coach.



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Courtesy All-Steel-Equip. Co.

This smartly laid-out locker room at Kensington, Md., High School features a series of single-tier lockers that are set on concrete bases and arranged so that they face alternately front and back in each row, eliminating congestion in dressing.

## FOR THE MODERN GYMNASIUM

**E**LECTRICALLY-Controlled scorers and timers are now quite commonplace throughout the country, both in indoor and outdoor play structures. Placed where everybody can see them, they serve the two-fold purpose of tabulating the score and keeping the time.

These utilitarian manipulations have definite spectator appeal. Crowds like to watch the time running out and to observe, at the same time, the frantic efforts of the players to protect or to overhaul a lead. Who, at one time or another, hasn't heard a crowd yell in concerted fashion, "Shoot, shoot!" While this practice may be undesirable from a coaching angle, it creates spectator interest and thus makes basketball a more popular game.

There are many types of electric timers and scorers on the market. Some are simple in design, while others are more ornate—recording everything but the temperatures of the coaches. Several of the more popular types, together with brief descriptions of each, follow:

Model B-40, the lowest priced scoreboard in the Nevco Scoreboard Co. line, is ideal for a small gymnasium. The face of the clock is 18 inches in diameter, white enamel on steel. The quarter figures, located above and on either side of the clock, are five inches high, indirectly lighted and appear in green, ivory, white and red.

Below the clock are two slots, one above the other, for removable name plates. These are 6½ by 28

inches, large enough to hold any school name in 5 inch letters. Cards may be used in the holders during tournament play.

The scoring figures are 3¾ inches high, white on a black background, and are set in the board directly above the name plates. The clock stops itself at the end of each quarter and sounds a siren.

The board has an overall size of 39 by 53½ by 7 inches. It is finished in black prisma-lac with chrome trim. Nevco furnishes it complete with control box and 10 feet of cable.



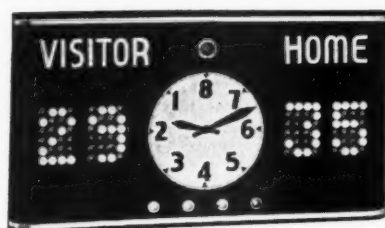
**Model B-40**

Nevco's Model LFB football board contains all the necessary mechanical parts for giving the correct time in minutes and seconds by quarters; the score of both teams; the correct down and the number of



yards to go. The scoring figures, down and yards to go come in red  $7\frac{1}{2}$  watt bulbs, giving figures 18 inches high. The clock face is 54 inches in diameter with 10 inch figures, and is lighted from the sides.

Nevco furnishes these sections in three parts, which when put together measure 11 feet long by 8 feet high by 10 feet deep. The remainder of the board may be purchased or built in the workshop at home, saving considerable freight and making it possible to use any materials that might be available.



**Figuregram**

*Figuregram*, product of the J. E. Porter Corp., features a type of score numeral consisting of a bank of incandescent bulbs. Certain sequences of these bulbs light up in response to a switch, forming the score numerals.

These numerals, or bulbs, are 12 inches high and are removable from the cabinet. They are standard  $7\frac{1}{2}$  watt electric bulbs obtainable at any drug or hardware store. They screw in and out of simple sockets, but each is guaranteed to last between 1000 and 2000 hours.

The clock, which is located directly in the center of the board and is flanked on either side by the score numerals, stops at the end of a quarter and a high-intensity horn automatically blows. The quarter lights, below the clock, are of four different colors.

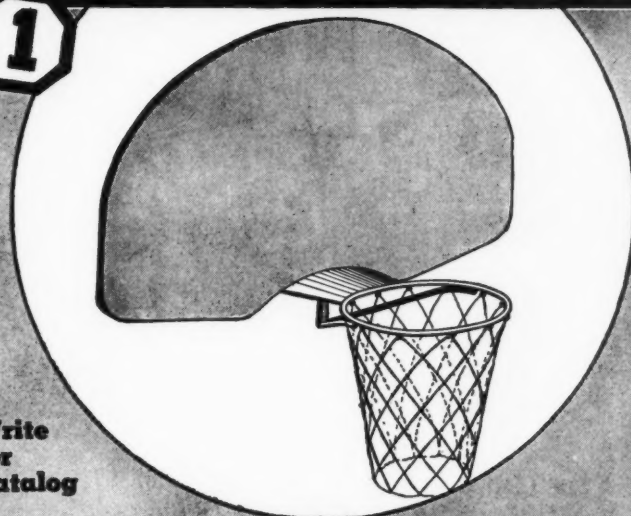
The latest model of the *Figuregram* has two important features, selective control and direct wiring. In the control box which operates the unit, there are several rows of buttons. If you want a "1" all you have to do is punch the button marked "1." If you want a "5" you punch the "5" button, etc. There is no simpler or easier kind of control.

The board is supplied with or without a time out clock. When furnished with such a device, the clock is built into the control box. This clock works in synchronization with the board's spectator clock. When the time-out button is punched in the control box, the spectator clock stops, the horn sounds, the time-out clock starts, and a red signal light in the control box lights.

(Continued on next page)

## MEDART HIT PARADE

1



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### NEW BASKETBALL BACKBOARD AND GOAL

Strictly in accord with official specifications as recently established by the National Basketball Committee... The new, streamlined Medart Backboard is 'pressed-out' of a single sheet of steel... Quantity production makes extremely attractive prices possible... Before changing your equipment get complete details of the Medart Steel Backboard and Goal — "No better equipment at any price!"

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## DON'T CODDLE ATHLETE'S FOOT DESTROY IT!

Athlete's Foot is a stubborn fungus infection that can be controlled only by a powerful, especially prepared fungicide. Alta-Co Powder is not a general germicide that is also used for combatting Athlete's Foot. It is a scientific preparation, developed for the specific job of killing the many fungi of Athlete's Foot — and it does just that.

- Alta-Co Powder kills Athlete's Foot fungi in less than 60 seconds.
- It remains stable in solution.
- Its strength can be tested instantly and accurately by inexperienced help with an Alta-Co Powder Tester.

No other material for this purpose possesses these three vital advantages

### White Alta-Co Powder

is recommended where there is objection to skin tinting.

### Alta-Co Powder with Tracer

This is suggested where Athlete's Foot Control is enforced, and a check on its use is desired. The slight yellowish tint is evidence of application.

Both are equal in fungus-killing power

Let us send you our free 32-page brochure on Athlete's Foot. It gives much valuable information on the different kinds of Athlete's Foot fungi and how to control them.

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HERE'S a way to encourage the boys and girls in your school to play *golf* and *tennis*—the sports they can enjoy all their lives! Scholastic Golf and Tennis Tournaments — *all intramural* — offer the handsome medals shown above to boy and girl winners in each school that holds a tournament. There is no entry fee, and each school participating receives free drawcharts and medals.

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SCHOLASTIC COACH, 220 East 42nd Street, New York:—Please register my school for a ☐ Golf Tournament; ☐ Tennis Tournament, and send free medals and drawcharts. The Golf Tournament will be for ☐ boys; ☐ girls. The Tennis Tournament will be for

☐ boys ☐ singles ☐ girls ☐ singles  
☐ doubles ☐ doubles

School enrollment..... Send medals by.....

Name..... Position.....

School.....

Street.....

City..... State.....

The Figuregram is 70 by 32 by 5 inches of all steel construction. It is a modern streamlined cabinet with life-time black enamel finish and bright chrome trim.

The *Bigtime Clock*, manufactured by the Sangamo Electric Co., can be constructed for use on a football scoreboard with any size dial face. It is supplied complete with the driving mechanism, hands, pinion track, and control station.

Dependable and consistent accuracy is achieved through the ingenious method of driving the second hand from its end on the outer edge of the dial. A gear mounted on the outer end of the second hand runs in a pinion track or ring gear, extending around the circumference of the clock. This gear is driven by a synchronous motor through a single pair of bevel gears, resulting in 100 percent control of the hand regardless of wind conditions, ice, snow, or sleet.

The clock is operated by remote control from the official timekeeper's station on the sideline. The control mechanism is connected to the clock on the scoreboard by an extension cord or permanent wiring, according to individual conditions. Two types of controlling devices are available. One consists of a pistol grip containing switches for starting, stopping, setting, and reversing. The other control is a desk timer with two dials, necessary switches and signal lights.



**Fair-Play De Luxe**

The new *DeLuxe Fair-Play* scoreboard comes completely wired, ready to hang on the wall. Manufactured by the Fair-Play Mfg. Co., this all-steel cabinet has a baked enamel finish and an overall size of 50 by 44 by 8½ inches. A 30-inch dial indicates minutes and seconds to play, the second handle being red and translucent.

The score numerals are 8 inches high, lighted from the rear, motor driven and instantly reversible for



corrections. Five-inch numerals to indicate quarters are stamped in steel wings and lighted with colored lights from the rear.

The clock is adjustable and features an automatic stop and a very loud horn. It may be set quickly from the control desk for shorter and overtime periods or for errors in starting. The time control, which comes in a bakelite case, has a patented adjustable and automatically resettable clock for timing time-out periods.

For an extra few dollars, the clock face may be fixed so that it will turn red during the last minute of play of each quarter. Along the bottom of the board there are hooks to attach team name plates if desired.

In Model FB-2, the wings to indicate quarters have been eliminated to reduce the cost, but may be added later. The timer and scorer is 38 inches long by 36 inches high. Like the other Fair-Play boards, this one is of steel construction, inside and out, and has a lacquer finish.



**Medart Scorer and Timer**

The Fred Medart Mfg. Co.'s Automatic Electric Scorer and Timer is streamlined from its compact size (74 by 42 by 5 inches) to its pleasing shape and black, baked enamel, wrinkle finish with aluminum trim. It flashes the score as fast as fingers can operate the control box, through 8½ in. star-bright numerals which consist of 6-8 volt lamps with individual aluminum reflectors.

The extra-large clock face is 27 in. in diameter and is available in types that will record either 20 minute halves, 8 minute quarters or 10 minute quarters. The face is translucent, being lighted from the rear. It is white when running but automatically changes to red during the last minute of play.

A loud, vibrator-type horn automatically signals the end of each period, which are located below the clock in easily read numerals with individual red signal lamps.

The control box is equipped with 7 plainly marked push buttons for complete control of the board, and 15 feet of cable.

(Continued on page 39)

## MEDART HIT PARADE



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### New FOBAFIMI SISAL GYM MATS

The greatest improvement in Mat construction in 50 years . . . Medart Gym Mats with Fobafimi Sisal Filler Pad are clean, sanitary, and easy to keep that way . . . Heavy duty construction throughout . . . Next time, insist on Medart Fobafimi Sisal Mats for a new experience in resiliency . . . Write for complete details concerning this radically new and improved mat.

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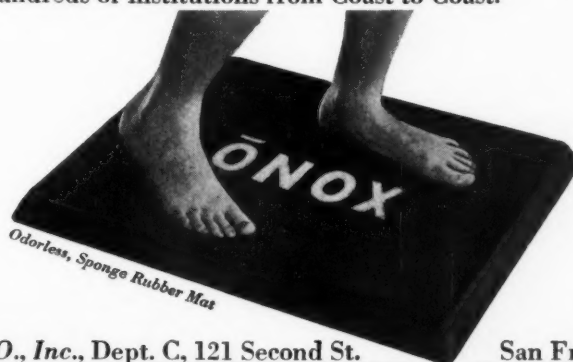
## New way to solve ATHLETE'S FOOT problem

**If you have shower rooms,** your problem is ever present. Your students are exposed to infection every day. Our problem is to convince you that ONOX is not "just another one of those Athlete's Foot remedies."

Recent research has upset former theories regarding the control of Athlete's Foot. ONOX is revolutionary. A safe non-poisonous skin toughener does the work. You may test it under any conditions you choose to impose and without obligation. For example:

- We will ship prepaid, your trial order for any amount of ONOX and equipment. Use it for 60 days. If at the end of that time ONOX has not proved itself to your complete satisfaction (100%) you owe us nothing and return nothing. This offer is open to any educational institution.

We would like to send you the simple details of the ONOX method now used by hundreds of institutions from Coast to Coast.



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*for increased attendance  
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**INSTALL A  
Lafayette  
SOUND SYSTEM**

Let them hear as well as see!—and get more people out to games and sports events. Modernize your stadium and gym with a precision-engineered Lafayette Sound System for dependable, high-quality service. Lafayette's 20 years experience is your assurance of the biggest value money can buy—and you will be pleasantly surprised to find how well a Lafayette Sound System fits into limited budgets.

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## SELECTING SOUND EQUIPMENT

By O. V. Swisher

IN ANY analysis of the factors that have contributed to increased spectator enjoyment of sports, sound systems throw practically everything else into the shade. They are the indispensable trappings of our modern gymnasiums and stadiums.

To appreciate fully the purpose they serve, you must remember that the average spectator knows little about the individual players and even less about the game itself. But as long as there's a "mike" in the house he doesn't have to worry. While following the play, he is kept informed of exactly what is happening. The names of the offensive players, the type of play being executed and the names of the defensive players are all announced clearly and graphically.

Many schools not only have a public address system for their athletic contests, but a radio and sound amplification throughout the entire school.

The public schools of Pittsburgh, Pa., stand out as leaders in this field. The Clifford B. Connelly Trade School was among the first to install a sound amplification system that connected all the classrooms and made it possible for the principal to talk to the entire student body from his office. Another purpose this system has served has been to bring educational programs to the classroom.<sup>1</sup>

### Tips for the buyer

A school contemplating the purchase of sound amplifying equipment should not take it upon itself to order and install the unit. Only a qualified sound engineer can determine the right type and size of the equipment. It is necessary to know the size of the audience to be reached, the distance sound is to be projected, the interfering agencies, the sound source (music, speech, recordings, etc.), the indoor space limitations, and the portability requirements.

An experienced engineer surveys the situation, makes recommendations, supervises the installation of the unit and gives instructions as to its care and operation. These services may be obtained without expense from manufacturers of quality equipment.

While a sound engineer is necessary for complete installation jobs,

there are certain stock units which have been designed to meet general requirements. This type of equipment is usually built into one or more light carrying cases, allowing the equipment to be easily moved about.

There are unlimited uses for portable equipment. In a coaching school a few summers ago the instructor used such a unit to explain clearly and without voice strain the formations and plays of the demonstrators. Another used it to make suggestions to runners on the track.

Such units have also been used to transmit instructions and to provide suitable music for large outdoor groups engaged in conditioning exercises. Track and field meets, folk dances, play days, outdoor games, and general playground activities are all handled more efficiently and with much less effort when the sound is amplified properly.

One of the most spectacular and useful sound systems for a school department is the trailer type. A portable sound amplifier, built within the body of an automobile trailer, and three horns, which are attached to the roof of the trailer, comprise the main units.<sup>2</sup>

The Connelly Trade School was one of the first schools to build a sound system of this type. They call it a mobile portable amplifier and field telephone system, and have used it on many occasions with huge success.

One outstanding occasion was a pageant in which the entire school participated. Other occasions were outdoor graduation exercises and Child Health Day programs. The mobile amplifier has been used extensively for conducting intramural meets, dual track meets, extracurricular outdoor activities, and national observance programs. The hygiene department of the school system also makes use of this equipment for the purpose of conducting grammar and high school district meets.

The unit is operated as follows: On the athletic field the trailer is detached from the car, and the automobile is moved so that the announcer can see the activities as he speaks into the mike. The mike is placed on a small shelf in the automobile and the windows closed so that the feed-back from the loud speakers will not interfere with the announcer's voice. The microphone

<sup>1</sup>Lamar, Emil, *The Athletic Plant*, p. 256.

<sup>2</sup>*Ibid.*, pp. 259, 260.

can also be used in the open air, except that the volume of sound must be reduced. The horns are always directed away from, and placed slightly forward of the microphone.

Students from the radio and telephone departments of the school are responsible for the maintenance and care.

Sound reenforcing equipment for the gym and swimming pool is essentially the same as the equipment for outdoor use. However, much less amplifier power is generally required and it is possible to use one of several types of loudspeakers. The selection, of course, depends upon room acoustics and seating arrangements. Generally an amplifier of 25 to 30 watts, housed in a cabinet suitable for shelf or wall mounting, will provide adequate power for any gym or pool.

In selecting loudspeakers for the gym, directional wood or metal type speakers usually give the best service. In the pool metal-housed automobile type loudspeakers give the best performance. The speakers should be placed on the pool ceiling and directed downward toward the surface of the water. This enables the swimmers to hear instructions more readily, and still provides adequate sound coverage for the spectators.

## Sports Shed

(Continued from page 14)

stalled at the time the accompanying pictures were taken, seat 2500 persons for a hockey game. For conventions and other events involving the use of the stage, space for 3000 additional seats is available in the middle of the fieldhouse. This gives the building a total seating capacity of 5500.

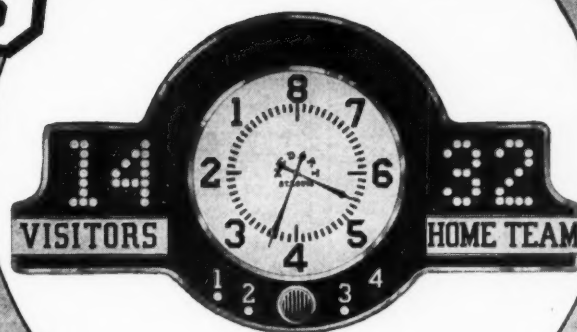
The cost of construction, \$27,-892.32, included the electric wiring, the water supply, the painting and the architect's fee. By deducting this fee, which usually is not included in citing building costs, the cost actually boils down to less than one dollar per square foot.

Last winter the building was used nightly for skating from January 24 to March 11. This solved the social recreation problem since dancing is not allowed at the College. An ice show and festival was also sponsored, so successfully in fact that the business men of the town agreed to underwrite a larger show the following year.

The regular schedule of hockey games was witnessed by an average attendance of about 700 per game, which is doing all right in a community having a population of 5800.

# MEDART HIT PARADE

3



Write  
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Automatic-Electric

## BASKETBALL SCOREBOARD AND TIMER

Smooth, streamlined, pleasing-to-the-eye exterior conceals a precision-built mechanism that is without equal... Large, easily read clock dial... Hair trigger quick and accurate score recording from control box to scoreboard... Place your local basketball games in the 'big time'—install a Medart Automatic-Electric Scoreboard and Time Clock in your gym. Catalog upon request.

**Fred MEDART Mfg. Co.**

3540 DeKalb Street

St. Louis, Mo.

## COVER EVERY DANGER SPOT in your gym!

### Don't Take Chances!

Injuries may occur anytime... broken collar bones, fractured arms may cause you to lose important contests — or even cost your school money!

#### LOW COST PROTECTION

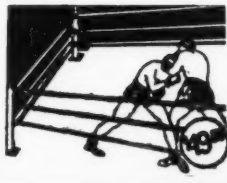
Goal Pads are made of a felt base covered with heavy brown army canvas. Strong metal grommets inserted for attaching to wall. Neatly quilted.

#### BUY NOW! PAY LATER!

Pay for these mats in small amounts each month out of receipts from games. No extra charge for this service. Order now and pay during playing season!

#### BOXING RING

A complete portable boxing ring designed for high schools and colleges. 2 boys can remove ring and clear floor in 6 minutes. Steel posts and guy rods anchor to permanent steel plates. Conforms to Amateur and Collegiate Association rules. Write for complete details.



#### GYM MATS

For Every Purpose

Nationally known JIM-FLEX Mats are all hand-tufted and made from genuine LAYER FELT 2" thick high count grade "A" — GUARANTEED 100% SAFE!

Write for copy of Catalog J41 which lists today's low school prices!

**NATIONAL SPORTS EQUIPMENT CO.**  
366 - 376 Marquette Street  
Fond Du Lac, Wisconsin

• DIRECT FACTORY TO YOU •

SPECIAL OFFER  
TO SCHOOLS ONLY  
TWO STANDARD SIZE  
**GOAL PADS**  
5 FT. X 10 FT.  
TWO \$25<sup>00</sup>  
for only  
1 INCH THICK

PLAYERS NEED  
THIS PROTECTION  
UNDER THE BASKET!





## CHAMPION

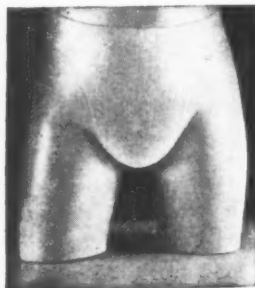
OFFERS THE NEW  
ARRA-SPORTVIZOR



Light-weight,  
plastic,  
practical  
eye-glass  
protector  
for  
basketball  
players.

### ARRA-SPORTER

Lastex  
improved  
supporter  
(by Hood)  
New,  
Different,  
Economical,  
Sanitary.



Write for Descriptive Folder.  
Write for New Champion 1941 Catalog.

CHAMPION KNITWEAR CO.  
77 St. Paul St. Rochester, N. Y.

## HELP FOR YOU A BARGAIN FOR PUPILS

You're not getting the best help for your work, and the best bargain for your pupils until you've tried SCHOLASTIC. The American High School Weekly as your classroom magazine.

These three features:

1. The space—for every-issue material expressly designed for your classes.
2. Frequent special numbers.
3. A five-front Guidance program: Jobs and Careers, Problems in Living, Manners and Conduct, Reading Improvement, Leisure-time Pursuits.

### IN 3 EDITIONS

English Class or Social Studies 50c  
Combined Edition 65c

### REQUEST FOR TRIAL COPIES

Send me on the "No Risk plan:

.....WEEKLY COPIES IN THE

..... EDITION

\*Right to change order before Feb. 15.

NAME .....

ADDRESS .....

SCHOLASTIC PUBLICATIONS  
SCHOLASTIC COACH  
SCHOLASTIC JUNIOR SCHOLASTIC  
430 KINNARD AVE., DAYTON, OHIO

## Tech Attack

(Continued from page 8)

No. 2, he sets himself and shoots.

Specialized one-hand shots by the pivot man and a possession game are other good tactics to adopt against retreated defenses. The possession attack sets up with two wide-playing pivot men and three pickets who hold the ball back near the center line. This does a very effective job of spreading the defense and giving players who can drive and handle the ball a chance to use their talents to the best advantage. The two pivots play wide and are always ready to break out and set up a post, or to come to the rescue of any outside man in distress.

Before adopting these tactics, of course, a team must first secure a lead. Very few defenses will come out for the ball unless they have to.

For defense Bradley uses a strict man-to-man, evading blocks and screens where possible and switching only when necessary. Against teams whose personnel is familiar, we dole out assignments according to the height, speed, ball-handling, and scoring ability of the individual opponents. In making these assignments due consideration is given to the roles played by the Bradley players in the offensive plans. Usually the opponents are covered from 30 to 35 feet from the defensive basket.

If the enemy depends on set plays, they are sometimes picked up at the center line, giving them no chance to set up.

Tech also uses an all-court man-to-man on occasions. If the opponents are known to favor a slow, deliberate game we spring an all-court defense on them from the opening whistle. But, as a rule, this type of defense is reserved for the later stages of the game.

Two seasons ago Bradley almost nipped the great undefeated Long Island University team by switching to an all-court defense in the second half.

By the uncanny accuracy of their long set shots the Blackbirds built up an impressive lead in the early stages of the game, the half ending 23-11 in their favor. Realizing that they couldn't trade set shots with Long Island, Bradley changed tactics at the beginning of the second half and covered the New York team all over the floor. These tactics speeded up the play to Bradley's advantage, and only the superior reserve power of Long Island enabled them to win 36-32.

## Antiphlogistine

the medicated dressing for  
Athletic Injuries

It is

Antiseptic  
Decongestive  
Soothing  
Repair-promoting

Sample on request

The Denver Chemical Mfg. Co.

167 Varick St.

New York

## Horn FOLDING BLEACHERS

20 Exclusive Advantages  
THAT ASSURE  
Maximum Seating Capacity  
Maximum Comfort  
Maximum Flexibility  
AT NO EXTRA COST

Write for Free literature.

HORN MANUFACTURING CO.  
Dept. S, Fort Dodge, Iowa

For TOP PERFORMANCE at LOWEST COST—  
RUBBER-COVERED  
**VOIT SPORTS  
EQUIPMENT**

USE AN  
**ELECTRIC  
SCORE BOARD**  
COSTS YOU ONLY

**\$15.00** WRITE FOR  
DETAILS

RENTEM, Inc.  
JASPER, IND.

PLEASE SEND, WITHOUT OBLIGATION, FULL DETAILS OF YOUR LIBERAL SCORE BOARD OFFER.

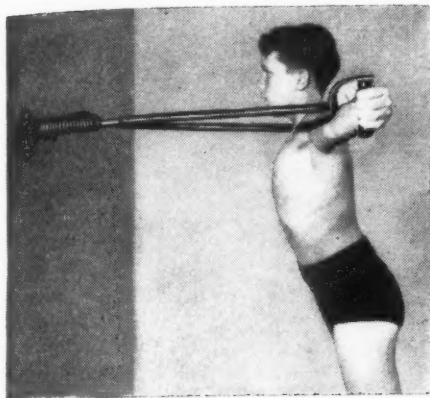
NAME

ADDRESS



## Gym Equipment

(Continued from page 35)



Mercury Bars are the Mercury Equipment Co.'s solution to the problem of correcting postural defects and maintaining good posture. They are scientifically designed to give, under tension, the correct movements and resistance for general yet controlled muscular development. They act through leverage to stretch the chest passively and actively work the back.

Standard Mercury Bars are made for permanent installation on a wall or like support, at a height to accommodate the range of individuals expected to use it, or at a height suitable for use from a seated position. This model is recommended for classes and groups. Some of these units may be mounted for use from standing positions and others for use from sitting positions.

The adjustable Mercury Bar unit is designed to meet the demands of those who have need of only one unit, and yet wish to use it standing as well as sitting. It is characterized by a compact, adjustable mounting that can be permanently secured.

Portable Mercury Bars are fully mobile and suited for professional use, the home or the classroom, where a permanent installation is not desired.

(Concluded on next page)

### INDOOR PUTTING GREENS

A PUTT SAVER THAT WILL LOWER YOUR SCORE

A PUTTING DEVICE THAT GIVES YOU NATURAL GREEN CONDITIONS

Circular on Request

\$11.50  
Delivered

**GOLF EQUIPMENT CO.**

1512 ROSEMONT AVE. CHICAGO, ILL.

### All-Electric Basketball Scoreboards



**\$59.50**

Write for free literature

**CEDAR KRAFT CO.**

CEDAR SPRINGS  
MICHIGAN

## MEDART HIT PARADE

4



Write  
for  
Catalog

### TELESCOPIC GYM SEATS

Originated by 'Medart' . . . Safe to use, safe to operate . . . An installation of Medart Telescopic Gym Seats assures absolute spectator visibility—an all important factor that will make your gymnasium pay a profit! Let us survey your gym and submit an accurate detailed recommendation. No obligation to you. Catalog upon request.

**Fred MEDART Mfg. Co.**

3540 DeKalb Street

St. Louis, Mo.

## SCHOLASTIC COACH MASTER COUPON

After checking carefully items desired, this coupon may be sent directly to Scholastic Coach advertising department, 220 East 42nd Street, New York, N. Y., from which point the advertiser will be notified of the requests.

#### BIKE WEB MFG. CO.

(See 2nd Cover)

- ☐ History of Basketball How many?
- ☐ Taping Film Reservation

#### CEDAR KRAFT CO. (39)

- ☐ Literature, Scoreboards

#### CHAMPION KNITWEAR (38)

- ☐ Catalog

#### CONTINENTAL CARNAVAR CORP. (24)

- ☐ "The Basketball Coach's Record Book"

#### DENVER CHEM. CO. (38)

- ☐ Sample Antiphlogistine

#### C. B. DOLGE CO. (33)

- ☐ Brochure on Athlete's Foot

#### DURENE ASSN. (1)

- ☐ Information

#### FAIR PLAY MFG. CO. (40)

- ☐ Information "Timers"

#### MARTY GILMAN (25)

- ☐ Catalog on Football Field Equip.

#### P. GOLDSMITH SONS (20)

- ☐ Catalog

#### HILLERICH & BRADSBY (25)

- ☐ Catalog
- ☐ Booklet, "Famous Sluggers of 1941"

#### Softball Rule Book

- ☐ How Many?

#### HILLYARD SALES CO. (27)

- ☐ "Basketball Chart and Score Book"
- ☐ Advice on Floor Problems

#### HIRSCH-WERNER (23)

- ☐ Sample Swatch
- ☐ Glamour Satin
- ☐ Endzone Twill
- ☐ Appalachian Cloth
- ☐ Sportmaster Poplin

#### HORN MFG. CO. (38)

- ☐ Illustrated Folder on Bleacher Installations

#### HUNTINGTON LABS. (6)

- ☐ Seal-O-San Basketball Digest

#### RICHARD M. JOHNSON CO. (40)

- ☐ Individual Embroidered Name Plate

#### KAHNFAST SATINS (31)

- ☐ 21-Color Swatch Folder

#### KNOX GELATINE (17)

- ☐ Basketball Weight Charts
- ☐ How many?

- ☐ Booklet, "Endurance, the Way to Victory in Basketball"
- ☐ How many?

#### LAFAYETTE RADIO CO. (36)

- ☐ Catalogs on Public Address Systems

#### LINEN THREAD CO. (19)

- ☐ Catalog on Sports Nets

#### G. McARTHUR & SONS (29)

- ☐ Free School Towel Plan

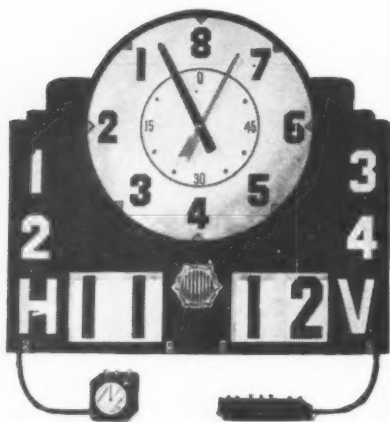
#### CHUCK MCGUINNESS (30)

- ☐ Information, Football Advisory Service

(Numbers in parentheses denote page on which advertisement may be found)

ON PAGE 40 ARE OTHER LISTINGS AND FORM FOR SIGNATURE

## IMMEDIATE DELIVERY



### SENSATIONAL DEMAND

Due to the great demand for FAIR-PLAY timers and scoreboards with the resettable clock feature schools have had to wait three and four weeks for delivery.

After January 6 immediate shipment can be made on all orders received.

Fair-Play is not IN the parade. It leads it.

### FAIR-PLAY MFG. CO.

Dept. SC-1 Des Moines, Iowa

## CHANGE NIGHTTIME into PLAYTIME with REVERE LIGHTING EQUIPMENT

The Only Complete Line of Floodlights and Poles

Give the sport-loving public added hours for the enjoyment of games of chance or skill by adequately lighting your sports arenas.

Professional and amateur leagues in every phase of sports are realizing big financial returns by playing night games. You can do the same.

Revere will engineer your lighting requirements for you. Write for Sports Lighting Bulletin.

**REVERE ELECTRIC MFG. CO.**  
2947 NORTH PAULINA STREET, CHICAGO  
Originators of the Hinged Floodlight Pole  
INDOOR and OUTDOOR LIGHTING EQUIPMENT of EVERY DESCRIPTION



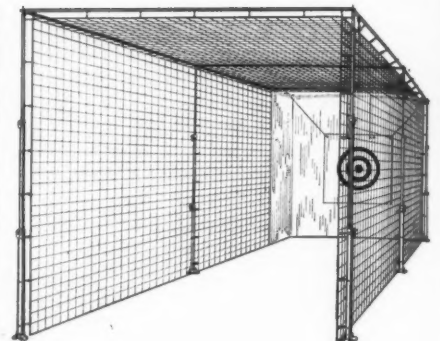
TRADE MARK

## WRESTLING MATS and COVERS



Wrestling Mat—20' x 20' x 2" - \$192.00  
Sateen Mat Cover—22' x 22' - 29.04

SEND FOR NEW BOOKLET  
**PETERSEN & COMPANY**  
5561 BAYNTON STREET PHILA., PA.



Gold Medal Golf Cages in many of our schools, colleges and private clubs are helping solve the problem of keeping the golfers in action during the cold-weather months. Manufactured by the Linen Thread Co., Inc., they come in sizes ranging from 10 by 10 by 10 feet to 20 by 10 by 12. There are no mental hazards for the golfers. They may swing naturally without fear of hitting the top or the side of the cage. Coaches may give valuable instruction on stance and swing, as well as on body and wrist movements.

Golf cages represent only one of the multiple uses of gymnasium netting. The Linen Thread Co. produces every conceivable type of netting, except hair nets and mesh stockings. They have nets for all games of high and low organization, and nets especially adaptable for partitioning large enclosures. The latter type makes it possible to carry on several different activities on the same floor, with absolutely no risk or danger to the players.



Putt Saver (above), a Golf Equipment Co. product, is a natural practice green 9 ft. long and 12 in. wide. Has a regulation size cup and a backstop for the ball.

## SCHOLASTIC COACH MASTER COUPON

(See page 39 for other listings)

(Numbers in parentheses denote page on which advertisement may be found)

### FRED MEDART MFG. CO.

Catalogs (33-5-7-9)

- ☐ Basketball Scoreboard & Timer
- ☐ New Fan-Shape Backboard & Goal
- ☐ Telescopic Gym Seats
- ☐ Gym Mats

### MENNEN CO. (29)

- ☐ Information on Athlete's Foot
- ☐ Sample of Quinsana How many?

### MERCURY EQUIPMENT CO. (27)

- ☐ Posture Chart
- ☐ Full Particulars

### NAT. SPORTS EQUIP. CO.

- ☐ Testimonial Folder & Catalog (37)

### NEVCO SCOREBOARD CO. (30)

- ☐ Catalog on Scoreboards

### ONOX CO. (35)

- ☐ Trial Order Onox (Athlete's Foot Remedy)

### PETERSEN & CO. (40)

- ☐ Catalog, Gym Mats & Covers

### J. E. PORTER CORP. (2)

- ☐ Illustrated Folder on New Fan-Shape Backboard
- ☐ Circulars on Gym Equipment

### JULES RACINE (36)

- ☐ New Sports Timer Catalog

### RCA MFG. CO. (3)

- ☐ Information on Public Address Systems

### RENTEM, INC. (38)

- ☐ Details on Electric Score Board

### REVERE ELECT. MFG. CO. (40)

- ☐ Sports Lighting Bull'n

### A. G. SPALDING

- ☐ Booklets, "Group Instruction in Golf," "Rights and Wrongs of Golf" (one of each per school)

### G. H. TENNANT CO. (31)

- ☐ Bulletin on Care of Floor

### TENNIS, GOLF, TOURNA- MENTS

See Page 34

### UNITED CLAY MINES CORP. (40)

- ☐ Bulletin, Field Marker

### UNIVERSAL BLEACHERS (28)

- ☐ Information Bulletins

### VESTAL CHEMICAL LABS. (32)

- ☐ Catalog
- ☐ Booklet, "How to Make Stars"

### VOIT RUBBER CO. (38)

- ☐ Catalog on Rubber Balls

### WILLIAMS IRON WORKS (30)

- ☐ Information, Grandstands

### WILSON SPORTING GOODS (4)

- ☐ Catalog

NAME \_\_\_\_\_ POSITION \_\_\_\_\_  
(Principal, coach, athletic director, physical director)

SCHOOL \_\_\_\_\_ ENROLLMENT \_\_\_\_\_

CITY \_\_\_\_\_ STATE \_\_\_\_\_

No coupon honored unless position is stated

January, 1941

## CONGAREE MARKER

The Perfect One for ATHLETIC FIELDS	PRICES F.O.B.	2000 Yds.	1000 Yds.	500 Yds.
Can't Hurt Grass, Player or Applier	Providence, R. I.	\$30.00	\$20.45	\$13.35
Use Wet or Dry Watch a Try	Trenton, N. J.	30.00	20.45	13.35
	Sanderson, Ga.	25.00	20.45	11.35
	E. Liverpool, Ohio	30.00	20.45	13.35
	Chicago, Ill.	30.00	20.45	13.35
	Los Angeles, Cal.	35.00	23.65	13.35
	San Francisco, Cal.	38.00	23.65	13.35
	Hawthorne, Fla.	25.00	20.45	11.35

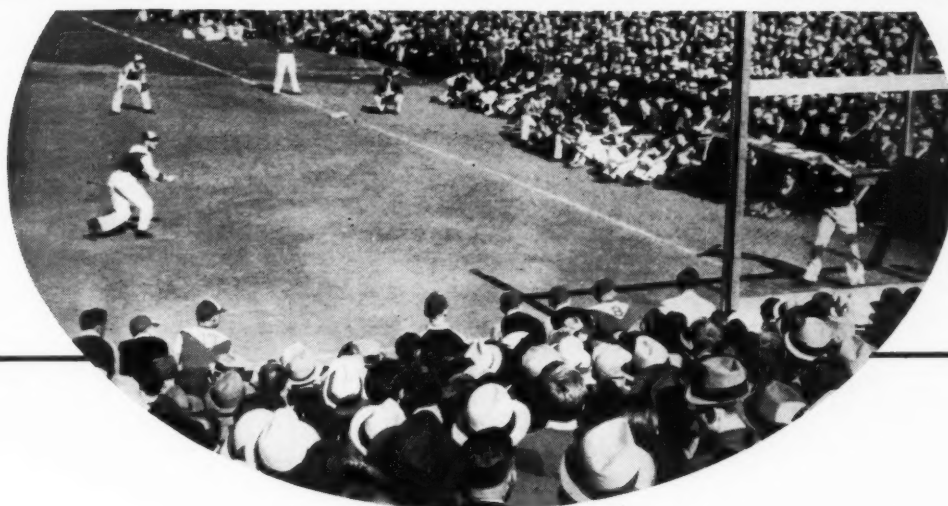
Send for Bulletin 408 100 Yds. 13.35 F.O.B. All Points

UNITED CLAY MINES CORP., TRENTON, N. J.

**Chenille Letters**  
• Felt Emblems •  
Pennants • • • Arm Bands  
**Richard M. Johnson Company**  
25 South St. Clair St. • • • • • Dayton, Ohio  
Salesmen wanted for new territories—Wire or write



# SOFTBALL IN *your* SCHOOL



## Here's an opportunity for your students to take part in a *nation-wide intramural softball program*

Softball is the new American fever; the sport and fun of nearly 500,000 teams and 10,000,000 players. From coast to coast on thousands of diamonds, in the gymnasium and out of doors, millions of boys and girls are playing this concentrated version of baseball.

In your school there are many softball players. To provide a definite, organized program for the millions of American high school students, boys and girls who want to play softball, the makers of PEPSI-COLA have designed and are sponsoring SCHOLASTIC SOFTBALL TOURNAMENTS, which are available without charge to every high school in the United States. These tournaments will be managed from the office of Scholastic Coach, 220 East 42nd Street, New York, N. Y.

*Fill in the coupon below. Organize your students into teams. Game schedules and a trophy for every member of the winning team will be sent to you without charge and without obligation. PEPSI-COLA COMPANY offers this to every high school in America in the interest of recreational sports. You are not asked to make any purchases of any product to take advantage of this opportunity.*

- 1** In the coupon below, estimate the number of students who might be interested in joining a team enrolled in a softball tournament.
- 2** Upon receiving the coupon below, or a copy of it, Scholastic Coach will send you an instruction memorandum which contains suggestions for conducting such a tournament. These may save time for some coaches. Others may want to follow a system of their own. Run these tournaments any way you choose.
- 3** You will receive 12 trophies: one for each member of the winning team and two for substitutes.
- 4** You will also receive drawcharts, and a CALL FOR PLAYERS. Post the announcement so that students who are interested can enroll. Fill in the names of teams on the Schedule Sheet, and your tournament is started.
- 5** In the spring, Scholastic Coach will publish several articles on the game. Watch for them. They may help your students to improve their games.
- 6** You may have TWO tournaments in your school, if you prefer. If you want to have one tournament for boys and another for girls, two sets of trophies will be sent to you. You may start the tournament in the gymnasium and continue it outdoors, if you like.

**ENROLL  
YOUR  
SCHOOL  
→  
TODAY**

SCHOLASTIC SOFTBALL TOURNAMENTS, 220 E. 42nd Street, New York, N. Y.

Please enroll my school

for boys' tournament ..... girls' tournament ..... and send the trophies, etc., to me.  
(check) (check)

I anticipate ..... in the boys' tournament and ..... in the girls' tournament. I would like to start  
actual playing of games by .....  
(insert date)

My Name ..... Position .....

Name of School ..... Address .....

City ..... State ..... Enrollment of school: boys ..... girls .....



# Penetrating LEATHER OIL

## SOFTENS HARD LEATHER

IVORY SYSTEM Penetrating Leather Oil is made in our own Shops in Peabody, Massachusetts, one of the great leather manufacturing centers of the world.

We have had an unlimited opportunity, therefore, both in our own Athletic Reconditioning Factory and throughout the Leather Industry, to establish the effectiveness of our product on all types of Leather, under all sorts of conditions.

As delivered to you, our oil will do all and more than we claim for it. Use it freely wherever leather parts have dried out and hardened—Rub it in well and flex the leather parts by massaging with the hands.

*Sold in  
Quart or Gallon  
Easy Access Cans*



# Ivory System

*Reconditioners of Athletic Equipment*

PEABODY

MASSACHUSETTS